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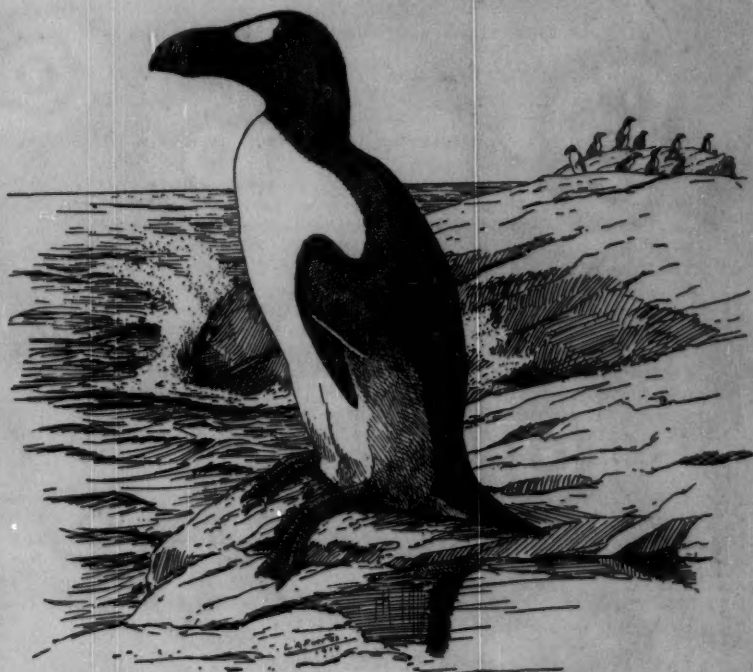
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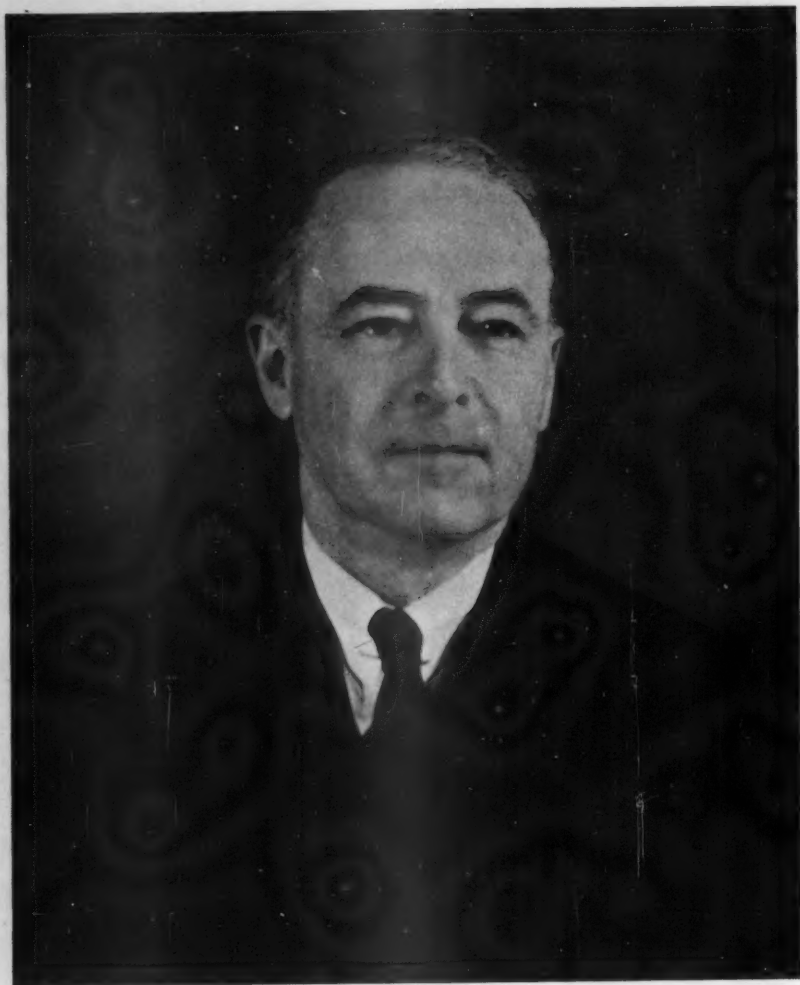
The American Ornithologists' Union

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Sincerely yours
Harry S. Swarth



THE AUK

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ORNITHOLOGY

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IN MEMORIAM: HARRY SCHELWALD SWARTH
1878-1935

BY JOSEPH MAILLIARD

Plate 6

ON THE morning of October 22, 1935, at his home in Berkeley, California, Harry Schelwald Swarth, a Fellow of the American Ornithologists' Union, died of a heart ailment from which he had suffered for more than a year. His all too early passing is not only a great sorrow to his family and immediate associates, but also a great loss to the branches of natural history in which he was prominent, ornithology and mammalogy. His interest as an investigator in these fields, and his zeal as a worker, coupled with his ability as a writer, have made his record one that will surely last.

Son of Carina Themmen and Ernest Adrian Swarth, he was born in Chicago, Illinois, on January 26, 1878. In or about 1869, his parents with their first two children and a brother, Auguste Swarth, had come to the United States and settled in Chicago, where Ernest was on the Board of Trade. The family lost most of their possessions in the great fire of 1871, but received prompt assistance from an aunt in Holland. Some time before, they had made the acquaintance of George Frean Morcom,—an acquaintance that ripened into such a wonderful friendship that Morcom lived either with or near the Swarth family for the rest of his life. At the time of the fire Morcom fled with the Swarths from the deadly flames and camped with them in the cemetery that later became Lincoln Park.

The winter of 1885-86 was passed by the Swarths and their friend in Los Angeles where they had invested to some extent in real estate, upon which they were fortunate enough to make some profit; but they returned to Chicago in the spring. In the winter of 1891, however, the two Swarth families came back to California accompanied by Morcom, whose health was failing, and settled in Los Angeles. Happily this devoted friend regained his health and lived on for forty years.

The two families settled in the western part of the town where they were surrounded by evidences of the premature "boom" that had already collapsed. Here they were close to open territory which was ideal for collecting ornithological and mammalogical specimens, as well as for shooting cottontail rabbits, a sport in which Morcom took much interest. Having had opportunity in England to indulge in shooting and fishing, Morcom had lost no time upon his arrival in Chicago in locating good territory for such sport. He had formed in England a great friendship for the ornithologist, John Gatcombe, and he not only had many specimens of game birds mounted but soon took an interest in birds of all kinds. After his arrival in California, he commenced to make a collection of the birds of this coast.

The collections were kept in his living quarters in one of the Swarth houses, and the boy Harry always had access to them, as he had to the Morcom ornithological library as well. Morcom never became an adept in the preparation of his specimens, so Swarth "learned to make bird skins of a sort and thus became useful." Where he learned to do this, or if, indeed, he had a teacher, is not indicated in the available sources of information. It seems probable that the art was picked up from observing the work of Frank Stephens of San Diego with whom the Swarths and their friend were well acquainted and of whom they thought highly. Possibly he "just learned" along with some of his schoolboy friends in Los Angeles, who were also becoming greatly interested in birds, generally beginning with the usual urge for collecting birds' eggs.

From his own account of his boyhood, Swarth used to get up at daybreak and go out collecting until breakfast time, going to grammar school regularly, sometimes going collecting in the afternoon as well with Morcom, and making up the specimens before bedtime. After grammar school he attended the Baptist College in Los Angeles. His mode of life was an ideal one for an earnest, studious youngster who was developing an interest in natural history,—exploration with Morcom of new territory for treasures as yet unknown to them; a reference library at hand for the identification of their specimens; and with a keen pleasure in their close companionship and in their work. What better could one ask for?

At first, apparently all the specimens went into the Morcom collection, but later Swarth started a collection of his own, and finally the two collections were donated to the California Academy of Sciences where they have been distributed in the main collection. The first bird collected and skinned in California by Swarth seems to have been a female Southern White-headed Woodpecker (*Dryobates albolarvatus gravirostris*) taken in the San Bernardino Mountains on June 20, 1894. Other specimens were collected in the next few days which he evidently passed in the same locality, as shown by the card index of his collection. So industrious were these two

enthusiasts that it was only a comparatively short time before the distribution of the birds of the neighborhood was well worked out and new fields for distributional work were discussed.

The card index of the Swarth collection shows that he started it in 1894, but he was also preparing specimens for Morcom and continued to do so for the next ten years. The index also shows that several of his schoolboy friends of the middle '90's were graduating from egg-collecting and were developing an interest in the birds themselves, for a few of the bird specimens in the collection were from the hands of some of his companions, who later became prominent in the early activities of the Cooper Ornithological Club.

When Swarth was eighteen years old, acting under the advice of Major C. E. Bendire, he decided upon an exploring trip to the Huachuca Mountains, Arizona; and with three companions he set out for that destination in February, 1896, in a two-horse farm wagon. The party remained in the field throughout the spring and well into July. During this period Swarth developed such an interest in that region that it led to many explorations in other parts of the State in later years and to his becoming a leading authority upon Arizonan ornithology. In all, he made six trips to Arizona, on the last of which I had the good fortune to accompany him and to experience one of the pleasantest and most satisfactory collecting trips of my life. On this occasion the expedition motored through some of the territory over which the farm-wagon outfit had passed thirty-one years before, while Swarth enlivened the way by pointing out camping grounds of the earlier trip and made interesting comparisons of present conditions with the old.

As the boy grew into manhood it became evident that he was destined to be an ornithologist, and in 1904 he secured a position in the Field Columbian Museum at Chicago, where he became an assistant in the Department of Zoology under the late Charles B. Cory. Here he lived with his brother Charles, and on Sunday mornings they would rise early, take a street car to the end of the line, and put in the entire day birding, ever on the lookout for rare species. These outings always remained among his pleasantest memories.

In 1908, the Museum of Vertebrate Zoology was opened at Berkeley, California, and Swarth was offered a position there, which he accepted, as assistant in ornithology, becoming Curator of Birds two years later. He was delighted to return to the West and to find that he was to have a large amount of outside work. Meanwhile he had been developing an interest in other branches, not only of ornithology but also of mammalogy, in addition to the study of distribution and differentiation, although the study of these two branches and their inter-relationships always remained his chief interest. Early in his career it became evident that he was endowed

with a retentive memory and had the happy faculty of keeping ever in mind the less apparent but very important details pertaining to the differentiation of forms and races. To such an extent did he develop this faculty by long study, as he accumulated material in the field, or by loans from other museums, that he was able to solve many difficult problems concerning the identification and classification of certain groups, and in consequence to take up the revision of several of these groups, particularly of birds, but of mammals as well.

In 1913, he was called to Los Angeles to become Assistant Director of the Museum of History, Science and Art, but after three years, returned to Berkeley to his former position as Curator of Birds, where he remained until, in 1927, he was offered the position of Curator of the Department of Ornithology and Mammalogy of the California Academy of Sciences, left open at that time by my own retirement from active life.

The courtesy had been shown me of being allowed to name my successor. Since I was well acquainted with Swarth and with his standing as an ornithologist and mammalogist, I deemed it advisable to secure his services, if possible, especially as I knew of his great interest in the avifauna of the Galapagos Islands, and of the need for working out the difficult taxonomic problems that exist in that region, from which the Academy had obtained a large collection of specimens. On March 1, 1927, Swarth was accordingly installed as Curator of the Department of Ornithology and Mammalogy. He at once took up the Galapagos work and for the next four years devoted a large part of his time to it.

In 1930, he was elected one of the delegates from the American Ornithologists' Union to attend the seventh meeting of the International Ornithological Congress held at Amsterdam, Holland, in June of that year. This gave him the opportunity to visit England where he was cordially received at the British and Rothschild Museums. In these institutions he was given every facility to study their series and type specimens of Galapagos birds which greatly assisted him to complete his report. This came out in 1931, under the title 'Avifauna of the Galapagos Islands,' as volume 18 of the Occasional Papers of the California Academy of Sciences, and is the most valuable paper of its kind so far written.

In consequence of his knowledge acquired in this study, Swarth was made chief of the scientific part of the Templeton Crocker Expedition to the Galapagos in 1932, when he at last had the opportunity to study the avifauna of the islands in its own habitat. There he came to realize how important it was to have both the fauna and flora of the Galapagos Islands given much needed protection and he exerted himself to bring this about. He finally got in touch with the Ecuadorean Government through the assistance of Mr. Robert T. Moore, of Los Angeles, California, a man well

acquainted with influential people in that country, and after much correspondence the matter was brought to a successful termination.

At the time of the gold-mining excitement in 1898, Swarth had been persuaded by his fellow member of the Cooper Ornithological Club, William B. Judson, to accompany him to Alaska, an expedition in which Morcom was sufficiently interested to assist. Judson went to search for gold while Swarth, though he may have hoped to find some gold, went primarily to see the country and to study the bird life there. The trip north was made in a boat crowded with all sorts of men, and the interstices in the human crowd were filled with all sorts of dogs, that is, of all sorts except the sort that could pull sleds, as Harry put it. Practically all the men and dogs were seasick. After a wretched trip, slowed down by long spells of fog, the ship reached Wrangell in February, 1898. Swarth was far from well at the time of arrival, and was delighted to go ashore. He made a trip up the Stikine River, but soon found that he really was ill and that this wild country was no place for a man in his condition. Fortunately he was tendered a friendly hand by a man who was soon to return to California and who offered to look after him on the way home, an offer which was gladly accepted.

This visit to the Northwest Coast, however, made such an impression upon Swarth's mind that it led to his making several field trips to that region. His early visits included a number of islands and rivers from Juneau southward to Vancouver Island; his later ones extended into the interior. Finally he became so much interested in the Atlin region of British Columbia that he spent several summers there, taking his family with him for the outing. His early work on that coast, in 1909, organized and supported by Miss Annie M. Alexander, was on behalf of the Museum of Vertebrate Zoology.

Several outstanding papers were the result of this work in southern Alaska and British Columbia. One of these, in which Swarth was junior author with Major Allan Brooks, was entitled 'A Distributional List of the Birds of British Columbia,' and appeared as number 17 of *Pacific Coast Avifauna*, published by the Cooper Ornithological Club in 1925. Of the last papers that he wrote, two were published in volume 23, 4th series, of the *Proceedings of the California Academy of Sciences*, in 1936; one was a list of the birds of the Atlin region of British Columbia and the other upon the origin of the fauna of the Sitkan district, Alaska. Another paper, upon the mammals of the Atlin region, is in press at this writing.

Besides collaborating with Major Brooks, Swarth wrote papers in co-authorship with other well-known ornithological investigators, particularly with Joseph Grinnell. Swarth's bibliography by Dr. Jean M. Linsdale, preceded by a short sketch of the man himself, appeared in 'The Condor,' volume 38, no. 4, pp. 155-168, July 1936, with three plates.

Swarth had early encountered some of the complications that arose from the study of what were first called "geographic variations" and are now recognized as subspecies. Becoming greatly interested in these variations and the inter-relationship of certain groups, he made an intensive study of them, and his comprehensive work resulted in many papers that have been of great value in the classification of certain forms not only of birds but of mammals as well. Geographically these studies included Alaska, with many of its coast islands; British Columbia; Arizona; sundry parts of California; Lower California; the islands off the west coasts of the United States and Mexico; and the Galapagos Islands. The work on Lower California was in collaboration with Dr. Joseph Grinnell; in British Columbia partly with Major Allan Brooks. In connection with this work he described thirty species and subspecies of birds (one with Allan Brooks and six with Grinnell), and eleven species and subspecies of mammals, of which two were with Grinnell.

His interest in literature and his careful work in all that he undertook, combined to make the tasks of editing and reviewing one of Swarth's outstanding accomplishments. He edited the latest 'Ten Year Index to The Auk' (1921-1930) and also was one of the proof-readers of the 'Check-list of North American Birds,' fourth edition. The first appearance of the initials "H. S. S." under a review was in 'The Condor,' volume 11, 1909, in which they appeared on four occasions. In volume 12 they were present eleven times, and thereafter he was recognized as a particularly painstaking and conscientious reviewer. Out of his two hundred and twenty-one titles, sixty-four were reviews; with one exception these appeared in 'The Condor' of which he was for many years associate editor, in fact, from 1910 until 1928.

A matter of keen interest to Swarth was the publication of his history of the Cooper Ornithological Club, which was brought out at the Club's annual dinner given in San Francisco in May 1929. It was easy to see what a pleasure the preparation of his material was to him,—a pleasure that I shared with him to a slight extent by being asked to assist photographically. Great was my surprise to find when the booklet came out that the last few pages were devoted to some of my supposedly humorous rhymicalities that had been read at Cooper Club dinners,—and this without his having given me a chance to polish up or to put the verses in better shape. He certainly did enjoy this little joke that he played on me.

In this history, which was published in 1929 under the title of 'The C. O. C. 1893-1928,' he gives a sketch of the formation of the short-lived Southern California Natural History Society of which he was one of the organizers in 1893. It soon disintegrated by members dropping out, joining the Cooper Club whose headquarters were at Santa Clara, California, and

holding meetings as members thereof in the southland. Such meetings were soon authorized as auxiliaries of the northern ones. As this did not work out quite satisfactorily a regular Southern Division of the Cooper Ornithological Club was finally established and "chapters" in other places were made permissible.

Swarth's name does not appear in the Club's register until 1897 for, as he modestly puts it in his history, he "attended meetings for a year or more with fair regularity before mustering up courage to ask if the Club would accept membership dues from him." He was gladly accepted within the ranks, and elected first treasurer and then secretary in Northern or Southern Divisions for many years. In 1921, he was made Vice-President and, in 1922, President of the Northern Division. He was ever ready to work for the Club, in which he took a great interest, but a certain nervous diffidence made him uncomfortable when presiding at meetings. Fortunately this diffidence in regard to some matters did not interfere with his confidence in his own observations and deductions. In fact, he was not only ready to serve but was always studying out ways and means for furthering the Club's interests and was one of our best workers.

When a child, Swarth suffered from an illness that weakened him seriously. From this he fortunately recovered at the age of fourteen, but it left him very quiet in disposition and very deliberate in thought and action. In fact, he was so quiet that he never cared to romp with his two children, but enjoyed reading to them selections from books he had enjoyed the most when young.

He was always painstaking and thorough, endowed with a retentive memory, so that his observations were distinctly reliable and his work was of a high order, valuable to present and undoubtedly to future generations of students of ornithology and mammalogy.

In addition to his life work, he was through his mother's influence greatly interested in literature, art and, though not a musician or even addicted to humming or whistling, in music. He was likewise indebted to his mother for a delightful sense of humor though, strange to say, he seldom laughed out loud; but he had a habit, of which he was probably unaware, of making little chuckling sounds from time to time,—and those of us about him early learned that, no matter how solemn his countenance, the immediate sequence of a chuckle was apt to be a keenly humorous observation that would bring tears to our eyes. Yet he never more than smiled!

He always kept in touch with certain booksellers, especially British, as the perusal of sale catalogues of old books was a joy to him, and the shelves of his home library have upon them a most interesting selection of his favorite authors. The book in his library that he most cherished was 'Birds through an Opera Glass,' by Florence Merriam Bailey, in which was

inscribed by Morcom, "Harry S. Swarth, April 25, 1890" and later by Swarth himself, "My first bird book! H. S. S."

In 1910 he married Miss Winifern Wood and lived in Berkeley, California, practically the rest of his life in the home he had purchased there. Mrs. Swarth and the two sons, George Selwyn and Morton Themmen, at times helped him in his field work, notably at Atlin, British Columbia, where the family passed several summers, but so far neither of the boys has followed in their father's footsteps, for George has taken up the study of law at Stanford University and Morton is still at school.

Swarth might have been made Director of the California Academy of Sciences; yet notwithstanding his long experience in museum work and his highly intelligent ideas concerning it, those of us who knew him well were aware that certain difficulties in carrying out his ideas and the petty trials connected with that position, would have been very wearing upon his nervous system. Also it would have interfered with his most valuable natural-history work which has been such a strong factor in maintaining the standing of the Academy. Upon the death of Dr. C. E. Grunsky, who as acting Director, followed Dr. B. W. Evermann, he was considered for the position, but in 1934 his failing health caused him to withdraw.

As set down under the heading "Biographical" in one of Swarth's notebooks, he held membership in the following organizations: Cooper Ornithological Club, 1897—; American Ornithologists' Union, Associate, 1900; Member, 1909; Fellow, 1916—; California Academy of Sciences, 1910—; Wilson Ornithological Club, 1910; Biological Society of Washington, 1914—; American Society of Mammalogists, 1919—; Sigma Xi, California Chapter, 1917—; Honorary Member, Audubon Association of the Pacific, 1927—; Corresponding Member, Northern Arizona Society of Science and Art, 1933—; "International Orn. Committee, July 6, 1934."

Swarth attended meetings of the American Ornithologists' Union whenever circumstances permitted him to do so and always upon his return told us of the great pleasure that it had been to him to meet so many of his ornithological friends and of the deep interest that he had felt in the papers and proceedings. The "A. O. U." meant almost as much to him as the "C. O. C." and he was ever ready to do anything and everything that he possibly could do to further its interests.

Although for eight years I was in close association with Swarth, many things about his life were naturally unknown to me, for information concerning which thanks are due to Mrs. Swarth and to his sisters, Miss Maud Swarth and Mrs. Clark R. Stanford.

From our midst has gone a man we can ill afford to lose. None who ever knew him well could fail to be his friend and to many, in his quiet way, he gave a helping hand. Treasured in our minds will be his memory.

LIFE-HISTORY OF THE BLACK-CHINNED JACAMAR

BY ALEXANDER F. SKUTCH

Plates 7, 8

At Birichiche beside the Ulua River in Honduras was a grove of stately cohune palms, with tall, massive, columnar trunks and spreading crowns of gigantic pinnate fronds. Tall as they stood, they were overshadowed by some noble silk-cotton trees and a few other giants of the forest. Scattered among the palms grew many wild fig trees, most of which had probably started life on the trunks of palms long since vanished. Here was a numerous troupe of Black Howling Monkeys, which enjoyed the protection of the owner of the banana plantation in which the grove stood. Their voices reverberated through the still air at dawn, and answered the echoes raised by the passing trains. Their grove stood between the railroad and the river, with extensive plantations of bananas on the other two sides; they never descended to the ground, and so had remained here and multiplied since the retreat of their ancestors had been cut off by the felling of the forest more than twenty-five years before, isolated as effectively as though they were on an island in the sea.

Here, among the many interesting birds which frequented the grove, I saw one cloudy afternoon a slender, graceful creature, scarcely larger than a Starling, with a long and very sharp black bill which it held with a saucy upward tilt. I watched it make long, graceful evolutions in the air, tracing beautiful loops and figures-of-eight, as it snatched up insects on the wing, usually returning to the same perch after each sally, to sit there quietly and await its next catch. Since the bird was of a kind entirely new to me, I took out my notebook and tried to write a description as it perched there, to look up its name later when I returned to my books. But I had undertaken a task more difficult than I at first supposed. The dark, metallic plumage was so wonderfully variable, in the dim light which filtered through the clouds and the palm fronds, that I could not decide what color it was. I wrote 'green' as the color of the bird's crown, but in a moment it turned its head and I was obliged to substitute 'blue'; and after I had described the broad band across the breast as blue, the bird shifted its position and the band appeared green. The wing feathers I first described as dusky, but when next I glimpsed them in a more favorable light, they also appeared green. Finally I gave up in despair and wrote: "Plumage wonderfully iridescent."

When next I encountered a Black-chinned Jacamar (*Galbula melanogenia*), three months later, it was on the open, bushy flood-plain of the Tela River. The light was good, and there could be no doubt that the bird's principal

color was bright metallic green; but over the feathers of its back and wings flickered the reflections of gold and burnished copper and bronze. The throat of the male was pure white, and it was necessary to look sharply through the binoculars to discern the small black feathers which are responsible for the descriptive portion of the bird's name. A broad green band across the breast separated the white of the throat from the chestnut of the belly. The outer tail feathers were of the same shade of chestnut, and when the tail was spread in flight they contrasted prettily with the green central quills which covered them in repose. Elsewhere the bird was green. The female differed from her mate in minor details only, principally in the color of the throat, which was faintly tinged with buff instead of pure white.

In Central America few birds are more attractive than the Black-chinned Jacamars. They possess all the physical characteristics which win so much admiration for the hummingbirds,—metallic brilliancy of plumage, richness and variety of color, delicacy of form, grace and dash of movement,—yet they are several times as large as hummingbirds without any detriment to their delicacy and grace. Hence they may be seen to better advantage, and are more companionable because they are nearer to our own scale of dimensions. In their family life, the mutual affection of the mated pair stands in very pleasing contrast to the unnatural aloofness of the male hummingbird. In voice the jacamars are hardly less attractive than in appearance. Their most usual call I can describe only as a squeak, but it is by no means an unpleasant sound, rather an appealing, endearing squeak. It reminds one of the squeaks uttered by some beloved toy of childhood when we squeezed it, and makes us want to caress the little gem-like bird, if only we could lay a hand upon the airy creature with the bright brown eyes and rapier bill. When two mated birds are together, this simple squeak undergoes a number of surprising modifications. In one of the most characteristic of these, the notes are at first uttered slowly, at well-separated intervals, but gradually they come faster, and finally again slower and with a higher pitch. Possibly we may represent the refrain in this way:

be-be-be-be be, be, be, be-be-be-be-be-be.

Both sexes also utter a high-pitched and very rapid trill, which at its best is almost silver-toned, but at other times is duller and reminds one of the rattle of a small kingfisher delivered at high speed. This trill is ordinarily voiced with the bill wide open and the lower mandible rapidly vibrating; but even with the bill closed on an insect they are able to utter a somewhat lower and less clear trill. The male sometimes sings a pretty song beginning with his little squeals, which become more animated and more melodious as the lay proceeds, and finally merge into rapid trills and high-pitched whistles. Although for pure, elemental sound no utterance of the jacamar

can compare in quality with the calls of the tinamous, or those of the Blue-throated Motmot (*Aspatha gularis*), its song is one of the longest, most varied in phrasing and most pleasing of any I have ever heard from a bird which is not an oscine or true song-bird. While the puff-birds are usually placed close to the jacamars in modern systems of classification, they are among the most nearly voiceless of Central American birds; and their extremely limited range of utterance and habitual taciturnity contrast with the great vocal flexibility and customary loquacity of the jacamar as strongly as their short, thick bills and heavy, ungraceful bodies contrast with the jacamar's long, slender bill and lithe, dainty form.

Although the slender, finely pointed bills of the jacamars seem poorly adapted to catching insects on the wing, they secure their food almost exclusively in this manner. But marvelous as is their skill in snatching small insects from the air with such narrow mandibles, it is exceeded by certain hummingbirds, notably the Jacobin (*Florisuga mellivora*), with even finer bills. The jacamars dart from their perch with a loud whirr of wings and seize the insect with a resounding snap as the bill closes upon it,—but this *clack* is loudest when they chance to miss the intended prey and the mandibles strike against each other. They are very expert in catching minute insects, for great precision of movement is needed to seize them in such a slender bill; but they usually prefer larger game. Large, brilliant-winged butterflies and great, filmy-pinioned dragonflies are their favorite food. One witnesses a beautiful if somewhat cruel display when one of these brilliant birds overtakes a great blue Morpho, or a magnificent yellow-and-black swallow-tail butterfly, returns to its perch with the hapless creature fluttering in its bill, and beats it against the branch until the gorgeous wings, vibrating rapidly until the last, fall away one by one and go twirling slowly to the ground, while the bird swallows the wingless body. All of the jacamar's prey, except soft-bodied flies, is beaten long and loudly against the perch before it is swallowed. Most observers agree that birds rarely catch the larger and more brilliantly colored butterflies, and this has been my own experience. I do not think it would be an exaggeration to say that I have seen more large butterflies eaten by jacamars and motmots than by all other kinds of birds taken together.

No one who admires Charles Kingsley's 'At Last' could forbear to quote a fine passage which touches upon this very point. He describes his first meeting with a jacamar in the forests of Trinidad: "Or are our eyes, accustomed to the blaze outside, unable to expand rapidly enough, and so liable to mistake for darkness air really full of light reflected downward, again and again, at every angle, from the glossy surfaces of a million leaves? At least we may be excused; for a bat has made the same mistake, and flits past us at noonday. And there is another—No; as it turns, a blaze of

metallic azure off the upper side of the wings proves this to be no bat, but a Morpho, a moth [!] as big as a bat. And what was that second larger flash of golden green, which dashed at the moth, and back to yonder branch not ten feet off? A Jacamar [*Galbula*]-kingfisher, as they miscall her here, sitting fearless of man, with the moth in her long beak. Her throat is snowy white, her underparts rich red brown. Her breast, and all her upper plumage and long tail, glitter with golden green. There is light enough in this darkness, it seems."

Since my first meeting with the Black-chinned Jacamar beside the Ulua River, six years ago, I have encountered the bird at scattered points, in the regions of Central America which drain into the Caribbean Sea or the Gulf of Mexico, from southeastern Costa Rica to the northern lowlands of the Department of El Quiché in Guatemala, and from sea level up to an altitude of about 2500 feet in the mountains. The range of the species is much more extensive than this, and stretches from southern Mexico to western Ecuador. These jacamars live chiefly in the heavier second-growth of the humid lowlands, and among such tangled vegetation are more easily heard than seen, although they are not particularly timid or fearful of man. Frequently they forage above streams which flow through tangled thickets, or along a trail that leads through the riotous growth which has taken possession of an abandoned plantation, where the clear space above the waterway or the pathway allows them more freedom in their aerial pursuits. They live also in forest that has been thinned by cutting trees for lumber, an operation which increases the amount of light that penetrates to the ground and augments the bushy undergrowth; but I have never seen them beneath the dark shade of the tall, primeval woodland. The two nests which I found were excavated in precipitous hillsides, rather bare of vegetation, amid the second-growth which they prefer. In Honduras and Guatemala their breeding season extends at least from March to June.

On the afternoon of April 22, 1932, while sliding and slipping down a steep hillside sparsely covered with small trees, vines and bushes at the base of the Sierra de Merendón on the boundary between Guatemala and Honduras, I frightened up a pair of jacamars. On searching the area whence they arose, I found a small depression, about an inch deep and freshly dug, which seemed to be the beginning of a nesting burrow. It was situated beneath the roots of a small tuft of grass on a steep, nearly bare portion of the slope. On returning to the same spot on the following afternoon, I found, just below this, a new excavation which had been begun within the last twenty-four hours and was already nine inches long. I wanted to watch the pair of jacamars at work, but could find on the precipitous slope no spot suitable to set up my umbrella blind, and was obliged to dig out a little shelf, broad enough to hold my camp stool, a few feet from their

burrow. When everything had been arranged and I settled down to watch them from concealment, I found that the birds would not continue to work with the blind so near, so I had to dig out another niche for myself farther down the hillside. Here I had better success and watched them at work for two days.

The two jacamars approached the burrow together, but the buff-throated female was clearly the leader in the undertaking. As she entered the tunnel, she kicked the earth backward with her feet, throwing out jets which continued after she had disappeared, but became shorter and shorter until finally they failed to reach the entrance, and followed the digger inward. She followed exactly the same method of removing the loosened earth that kingfishers and motmots use. When, after a few minutes in the earth, she emerged tail first, her mate caught a large, filmy-winged dragonfly and began to beat it against the limb on which he habitually perched. It slipped from his grasp, but he darted after it and easily overtook it. When it was sufficiently lifeless, he gave it to the female, who had been waiting expectantly close beside him while he completed the process of quieting the victim. Then she entered again, while the male remained on a dead limb in front of the burrow, the whole time uttering little squeals which sounded very far away. When she came out after two minutes of work the male flew to the entrance, but merely thrust his head into the tunnel and left at once. So two hours passed, the female alone digging in the burrow, while the male waited near the entrance, squealing and sometimes trilling, as though to encourage her in her labors. Often he perched on one of the fronds of a large fern which grew beside the burrow, and I noticed that his chestnut belly was of nearly the same color as the scales which covered the heavy 'fiddlestick' of a newly expanding frond. When the female emerged from her labors, her mate often caught a dragonfly or a large butterfly from which he removed the lovely wings, a small beetle with splendid metallic green shards, or some other morsel with which he rewarded her. Often he flew to the burrow, but came back again without having worked. At each visit he went in a little farther, until finally only the tip of his tail remained visible from the outside, and at length he began to scratch in the entrance. Once he actually flew backward as he emerged from the burrow.

The male seemed to be gradually warming up to the point of entering the excavation to help with the digging. By the middle of the morning he actually did so, but at first for only the fraction of a minute at a time. Still his enthusiasm for the work was increasing, and before noon he regularly alternated with his mate, remaining at his task from two to four minutes at a stretch. Once he flew away while his mate was at work. While he was gone she emerged from the burrow and perched in front of it to await him. On returning, he alighted beside her and began to bow.

He turned rapidly from side to side on his perch, bobbed his head up, down and sideways, pumped his tail back and forth, while he uttered low, squealing notes. During the whole performance the female trilled sweetly. On another occasion I saw the two perch side by side, spread their tails fanwise, revealing the chestnut outer feathers, and bow up and down to each other, very much in the manner of Flickers.

That afternoon was excessively warm, and my clothes became soaked with perspiration as I sat in the blind. Yet rarely have I seen birds work at their nest as continuously, as long or as energetically as the jacamars. Perhaps they had lost a first nest elsewhere and were therefore in a particular hurry to finish this, for others of their kind were already feeding their young. The male now took an almost equal share with his mate, and fully atoned for the slight excess of work he permitted her to do by continuing to feed her. Indeed, he kept her so well supplied with insects that she rarely caught one for herself. Once, when she had just started to enter the tunnel, he caught a small green beetle and called her back before she had passed beyond sight. After knocking it several times against the fern stipe he billed it to her. While the male was inside, his mate sometimes trilled, just as he did while she was at work. They had already begun to enlarge the nesting chamber, which gave them room to turn around, and were coming out head foremost now. Sometimes the male paused a moment in the entrance as he emerged, and made a most attractive picture with his black bill, green head, white throat and green breast-band framed in the round opening in the rust-colored earth. I am afraid it was all lost on his mate, who was in such a hurry to continue with the digging that she could hardly wait until he came forth, and dashed to the entrance even before he had cleared it. Sometimes she went in while he was still there.

The needle-like bills of the jacamars seemed better fitted for the weaving of some wonderful fabric like an oriole's or a cacique's nest than for the coarse work of delving in the earth. It is hard to explain the jacamars' possession of such bills on any utilitarian principle, for they seem as little adapted to their mode of feeding by catching insects on the wing as to the digging of their burrows, and yet the birds do both very well. One would expect birds of their habits to be equipped with broad, heavy, flat bills, like the motmots which they resemble in so many of their customs. Perhaps we are inclined to be too utilitarian in our search for adaptations, and should rely more upon esthetic principles. The long, slender bill certainly fits to perfection the jacamars' style of beauty, and it would be as difficult to picture them with the motmot's coarse and heavy rostrum as to imagine a tern with a pelican's pouched bill. They used their bills chiefly for loosening the soil and pushed it out of the burrow with their feet. Sometimes they emerged bearing a lump in the bill, and once the female while digging

found a grub or something of the kind, which she carried out and ate. Their bills became dusted with earth, but their glittering plumage remained remarkably fresh and clean during the course of their labors.

On the third day after their burrow had been started, I found the pair of jacamars at work when I arrived at a quarter after eight in the morning. They labored, with short intermissions, throughout the day; and when I was obliged to leave them in order to visit some other nests, at half-past four in the afternoon, they were still digging, but their burrow appeared to be nearly finished. It went straight into the earth without turning and widened into the nesting chamber at the rear. From the entrance to the back of the chamber its total length was sixteen and a half inches. The tunnel was only two inches in diameter and too narrow to admit my hand. Unfortunately for me, the birds had encountered a root at the end of the burrow and were obliged to enlarge their nesting chamber downward, with the result that the floor was just far enough below the level of the tunnel to make it impossible to see the eggs from the front. I did not dare to open the burrow until the birds had begun to incubate, which was about two weeks after their excavations had been completed. Then I dug into the hillside a horizontal shaft, which began on a level with the entrance, several inches away from it, and struck in obliquely until it touched the side of the nesting chamber. I found the soil very soft and friable, so the birds had not had a very laborious task of excavation. When my shaft had become wide enough to admit my hand, I drew forth four small, pure-white eggs which were nearly round and appeared quite fresh, for the shells were somewhat translucent and the yolks shone through. Incubation could hardly have been in progress more than two or three days. They measured: 22.2 x 19.1, 22.2 x 19.1, 22.2 x 19.4 and 23 x 19.8 millimeters. After taking their measurements, I returned them to their berth on the bare floor of the chamber, for the birds had brought in no softer lining. Then I closed the shaft with a stone and packed the earth in its entrance.

Although I could not see the eggs from the entrance of the burrow because they rested too low, I soon discovered that if I approached stealthily I could peep in and see the greater part of the bird who warmed them. There at the back, it sat, facing me, the sharp bill jauntily upturned and covered with earth on the end, the white throat gleaming like freshly fallen snow in the glare of the flashlight, the deep brown eyes sparkling in the beam, the green cheeks and breast returning iridescent scintillations here and there, as the light happened to strike them. The bird stared into the beam motionless and unblinkingly, and remained so until I extinguished the light and stole away.

I returned after the stars began to shine and again found the bird with the pure white throat in the burrow. It was always the same when I looked in.

"Poor little overworked husband," I exclaimed to myself, "you not only provide for your mate while she digs the burrow, take an almost equal share in the labor yourself, but must sit on the eggs most of the day and all of the night." I had already found that male woodpeckers, anis and Ringed Kingfishers incubate at night, and here was another bird to add to the list. The game was becoming exciting. I might have continued to believe that the male warmed the eggs during the night, had I not spent many hours in front of the nest in the blind, watching for the birds to enter and leave. I soon noticed that the female was less easily frightened from the burrow than her mate by the vibrations of the earth when someone walked heavily near it, and since I had found with other species that the bird whose attachment to the nest is the stronger usually occupies it during the hours of darkness, this observation made me question the correctness of my first conclusion that the male incubated at night. After I had seen the female disappear into the burrow I stole up and peeped in, only to behold again the white-throated male. Then the truth dawned upon me; in the artificial light her throat, which by daylight was distinctly buffy, appeared as white as his. The next time, I came with a more powerful flashlight, and thought I could detect a slight tinge of buff on the female's throat as she sat in the burrow; but even in the beam of a three-cell battery the difference between her and her mate was not convincing. The pitfalls for the unwary are innumerable. There was no way to solve the problem except to watch from the blind the goings and comings of the birds. This was not easy, because sometimes a bird would approach the burrow from a point outside of my limited range of vision, and enter it so rapidly that I was unable to distinguish its sex; at other times it would dart forth and fly away without allowing me a good look at its throat.

The jacamars arranged their turns on the nest in much the same manner as the Amazon and the Green Kingfishers (*Chloroceryle amazona* and *C. americana isthmica*), especially the latter. The female, I afterward made quite sure, incubated every night. Her mate arrived before sunrise in the morning, alighted on his customary perch before the burrow and called. She answered in a lower voice from within the nest and came to the entrance, where sometimes she paused a moment with her head framed in the aperture, then flew swiftly away. The male added another insect or two to his hastily snatched breakfast and then entered the burrow. His early entry into the nest gave him perhaps fifteen or at most twenty minutes in which there was sufficient light to catch his morning meal. He was very regular in his time of going on the nest. On three successive mornings he went into the burrow at 5.24, 5.24 and 5.37 o'clock. I think he was late on the third morning because it was dark and overcast and he had difficulty in finishing his breakfast any sooner. His mate had become impatient and left the eggs six minutes before his arrival.

At some time between seven and half-past seven o'clock the female, having made a good breakfast, returned to relieve her mate. She called him forth from the burrow just as he had called her, and entered as soon as he departed. Once she went in with a fly held in her bill. After the male had flown down the bushy hillside he called in his trill, and she answered in low, rapid squeaks from the burrow. Two or two and a half hours later the male returned for his second turn on the nest. Thus they alternated throughout the day. The male had a long session of three hours or more in the late afternoon. Once the female appeared at a quarter after five and called to him, but it was so unusually early for her to relieve him that he remained in the burrow until she went in. On another day she was much later; the male waited on the eggs until twenty minutes after six, and came forth at length holding a lump of clay in his bill, possibly as a symbol of his hunger. He called for his mate before he flew off. She entered twenty minutes later, in the gathering dusk. Usually she delayed until after sunset before she went into the burrow for the night. This arrangement gave her mate scant time for his evening meal and, just as he had begun the day with a hasty breakfast, he was obliged to end it with a light supper.

During the course of incubation a great quantity of the hard parts of insects, conspicuous among which were glittering particles of the armor of a metallic green beetle, were regurgitated by the birds as they sat, and these accumulated on the floor of the nesting chamber. For a small bird, the eggs required a long period of incubation. They did not hatch until eighteen days after I had first seen them, and doubtless they had been incubated for a day or two before that. But other burrow-nesters also take long to hatch their eggs. The Amazon Kingfisher must incubate for twenty-two days, and the Blue-throated Motmot (*Aspatha gularis*) for twenty-one or twenty-two, while even the Rough-winged Swallow must warm her eggs for sixteen days before they hatch.

The nestlings bore a copious natal down, long, soft and white, over most of their body. The long white down on the chin and throat, hanging over the chest, gave them the appearance of being prematurely bearded and aged. Their skin was pink; their eyes covered by the closed lids, were no more than black protuberances. Both the outer and the inner toes were directed forward, although the corresponding toes of older nestlings and of the adults are turned backward. Their oval heel-pads were already prominent and considerably broader than the tarsus, but unlike the narrower pads on the heels of young kingfishers and woodpeckers, they were nearly smooth. These little cushions of callous skin are found on the heels of many nestlings who pass their infancy standing erect in a nest without any soft lining,—whether in a burrow with an earthen bottom, a hole in a tree with a wooden floor, or a cavity in a termites' nest littered with chips of the hard black

substance of the termitarium,—and prevent the abrasion of the heel joint as the little birds move about on the hard, uncarpeted floor of their nursery. The newly hatched jacamars' lower mandibles projected slightly beyond the upper, as do those of young kingfishers. They could already stand erect and peep very softly. While I held them in my hands both of their parents arrived with small insects in their bills and perched not far distant, uttering complaining squeals, but they neither darted at me nor attempted to lure me away; yet they were very much attached to their young, and two days later the mother allowed me to touch her while she brooded them in the burrow.

The parents were tardy about removing the empty egg-shells, and left them in the burrow for several days. Both joined in feeding the nestlings with winged insects of many kinds, and when the little birds were four days old they were served dragonflies whose slender bodies were as long as themselves. These were of course delivered to them after the wings had been removed. I watched the male as he perched on a dead twig in front of my blind, catching insects for his nestlings, while the female brooded them. He was constantly turning his head from side to side, alert to pounce upon any sizable insect which came within his range. Smaller insects, such as might have appealed to a swallow or a flycatcher, were entirely disdained, although they might pass within a few inches of his perch. He deemed nothing smaller than a house-fly worthy of his attention, and he considered even insects of this size too trifling to take into the burrow for his young, but swallowed them at once himself. He made long, swift sallies after passing dragonflies and butterflies; when he caught them he returned to his favorite perch and knocked off the wings before he carried them into the nest. He was not without spirit and drove a Lesson's Motmot, much larger than himself, away from the vicinity of the burrow.

When the nestlings were six days old their eyes began to open and the pin-feathers started to push out, most of them terminated, like the seed of a dandelion, by the star-like tufts of down. The upper mandible of the black bill was already longer than the lower. The feet were yellow and the first and fourth toes, which at hatching were turned somewhat forward, already pointed backward. They huddled together in the center of the nesting chamber, facing outward and standing erect on the full foot, like young kingfishers. While they waited for their parents to bring them food, they uttered, in a little, far-away voice, the characteristic song of the adults:

be-be-be-be-be, be, be, be, be-be-be-be.

The development of their voices was very different from that of true song-birds, which do not sing until some time after they have left the nest, and in many cases probably not until the following spring. But the jacamars,

when they were eight days old and their eyes fully open, already uttered a pleasing little trill which was a very good imitation of that of their parents. When I pulled them from the burrow they emerged with their pin-feathers, particularly those of the head and neck, all standing on end, so that they bristled like porcupines and it was hardly possible to find their eyes in the pincushions which were their heads. As I held them in my hand they gradually laid back their feathers and assumed their normal appearance.

When, at the age of twelve days, the nestlings' feathers began to protrude from their horny sheaths, I could see that two would have pure white throats and two buffy throats; there were two brothers and two sisters in the family. They were bright, sprightly youngsters, constantly turning the head from side to side, opening and closing the bill and moving their wings. About this time (it was then approaching the middle of June) the heavy rains began, their burrow became damp and muddy and their feet and bills were soon caked with mud. As they preened their sprouting feathers with their mud-tipped bills, the natal down adhered to them and remained sticking there. To add to their troubles, small ants invaded their nest, probably attracted by the maggots which bred in the filth on the floor, for jacamar parents take no more sanitary precautions than kingfishers, motmots and trogons. Nevertheless, the feathers of the little birds remained fresh and clean, because they stood erect and did not permit them to touch the soiled, muddy floor of their nursery.

One morning, upon visiting the nest, I found all four nestlings lying on the hillside in front of it, unable to fly and quite helpless, although they were fully feathered. I replaced them in the burrow, after I had cleaned it out and removed the ants which had driven them forth. The two males eventually died from their exposure, but their sisters survived and left the nest at the age of twenty days, when they could fly very well.

While these jacamars were incubating their eggs, I found the burrow of another pair, tunneled into a steep, bare slope in a little amphitheater in a precipitous hillside covered with dense second-growth. The burrow was only thirteen inches long, and with my flashlight I could easily see the four blind nestlings, that stood pressed close together in the middle of their nursery. As I sat on the hillside, twenty-five feet away, to watch their parents bring them food, I heard their constantly reiterated little cries emerging from the earth. Soon both parents brought them butterflies from which the wings had been removed. The male was much less cautious than the female, and after fidgeting around for a few minutes delivered his burden, while she delayed nearly a half-hour before she would approach the burrow. As I noticed also on later occasions, she was characteristically more cautious than he.

These parents had better fortune than the other pair and brought all

four of their young forth from the nest, early in May before the rains began. There were three males and one female in the family, and when they were fledged each bore a close resemblance to its parent of the same sex. They were truly gems from out of the earth, the more precious because no man could set a price on them. No diamond or emerald or other stone was ever more scintillating and iridescent than they. Neither words nor photographs can do justice to the fire and sparkle of the deep-green plumage of their backs and wings, over which played in wondrous fashion reflections of bronze and gold and burnished copper. It seemed to show to better advantage in the shadow of the thicket than in full sunlight, as though it depended upon no external source of light for its brilliance. But one need hardly marvel at their loveliness, for loveliness was their daily fare. Beneath the branch where their parents perched to prepare their food, I picked up the broad wings of a Morpho butterfly. Wonderful as was the play of blue and azure on their satiny expanse, it paled before the leaping flame of the birds' green coats. They had transmuted the butterflies' loveliness into a higher, more animated, more sentient beauty. But why must beauty ever be nourished at the expense of beauty, why must one destroy in order to create?

Regretfully I watched the parent jacamars lead their family away into the depths of the thicket. In voice, in mannerisms, in appearance, there were never more winsome nestlings.

DESCRIPTION OF PLATES

PLATE 7

Left: Site of nesting burrow of the Black-chinned Jacamar. Foothills of the Sierra de Merendón, Department of Izabal, Guatemala, May 6, 1932.

Upper right: Nestling Black-chinned Jacamar, two days old.

Lower right: Nestling thirteen days old, with the feathers just beginning to escape their sheaths.

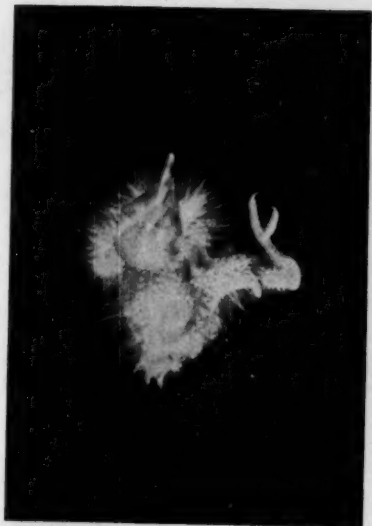
PLATE 8

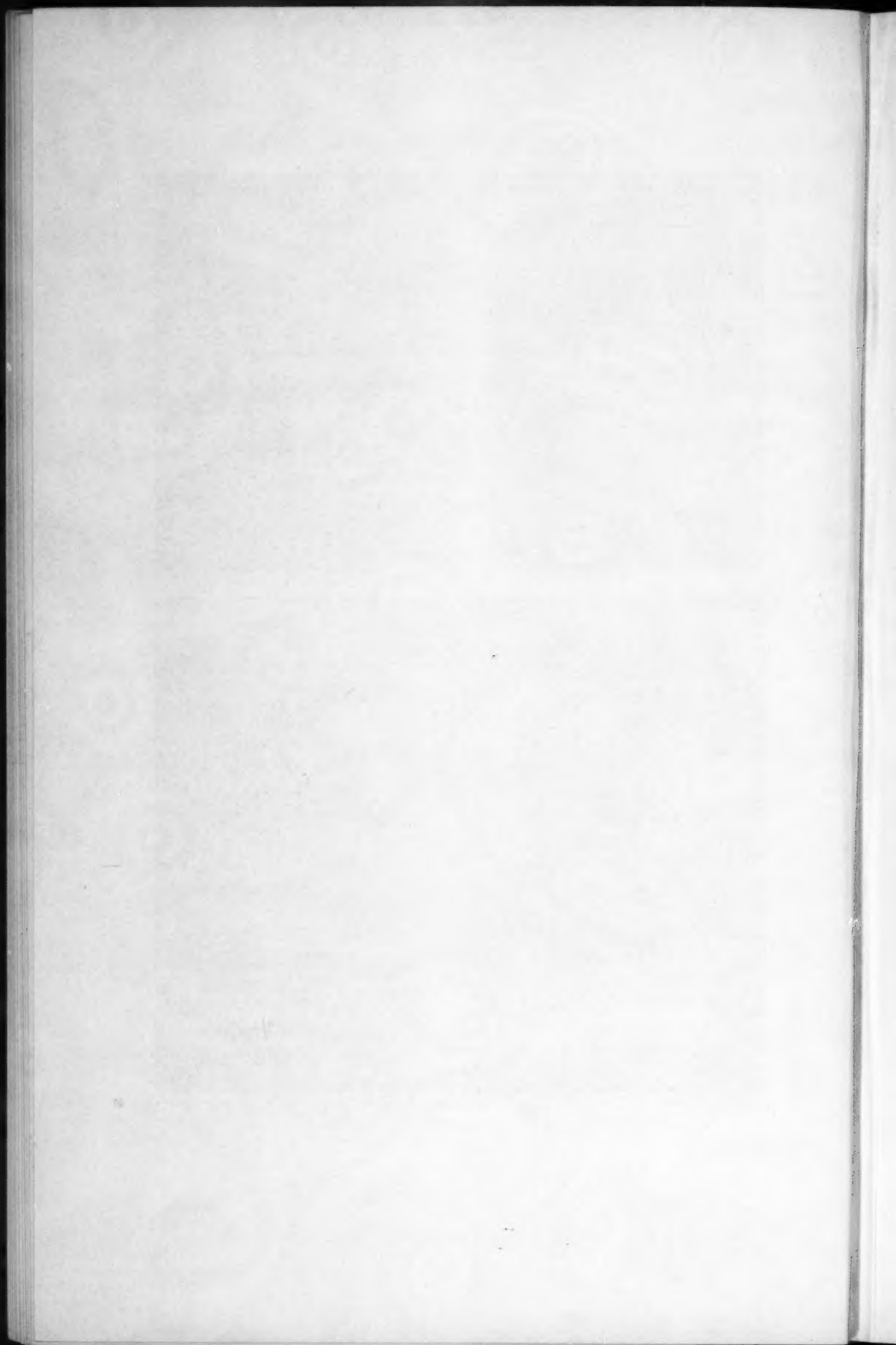
Above: Fledgling Black-chinned Jacamars, ready to leave their burrow.

Lower left: A female nestling, seventeen days old.

Lower right: A seventeen-day-old nestling, placed on its back, to show the heel pads.

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ORNITHOLOGY OF THE SECOND BYRD ANTARCTIC EXPEDITION

BY PAUL A. SIPLE AND ALTON A. LINDSEY

THE second Byrd Antarctic Expedition embarked from Boston on October 11, 1933. After passing through the Panama Canal, we touched Easter Island, then crossed the Pacific to Wellington, New Zealand. A southeast course from there brought our vessel into ice-filled antarctic waters east of the Ross Sea. A large area of unknown ocean was explored by ship and airplane as far east as the 116th meridian, where we turned westward again. One month after the ship had first entered the pack-ice, it reached the southernmost shore of the Ross Sea. The Bay of Whales is that point on the circumference of the antarctic continent where the ocean encroaches farthest toward the pole. Here at 78° 34' S. and 163° 56' W., the base camp was established on the floating shelf ice of the Ross Barrier. The ice-party occupied the Bay of Whales base from January 17, 1934, until February 5, 1935, while the ships wintered in New Zealand. The itinerary of the return voyage included Dunedin, New Zealand, Easter Island, Albe-marle Island of the Galapagos archipelago, and Panama. The expedition arrived in the United States on May 10, 1935, after an absence of nineteen months.

The present paper reports the birds observed at sea and on the antarctic continent by the writers during the second Byrd expedition, when Lindsey studied the vertebrates of the Bay of Whales region, and Siple worked for two months in Marie Byrd Land. Observations in the Bay of Whales made by Siple during the first Byrd expedition are also included in the discussions of seasonal occurrence. His collection of bird skins made in 1929-30 has been reported on by Dr. R. C. Murphy in 'Oceanic Birds of South America' under the biographies of the species in question. The 1933-35 collection made by Lindsey is summarized below. The writers are grateful to Professor A. A. Allen and Dr. R. C. Murphy for critical reading of the manuscript, and to Dr. Murphy for verifying and correcting their identifications of the oceanic-bird material collected, which has been placed in the American Museum of Natural History.

Fifty-four species of birds were identified in the course of the second expedition. Twenty-three of these were non-oceanic birds which came aboard ship from October 14 to 30 between New York and Panama. Nine species of sparrows and four species of warblers were among the passerine birds. The following list includes the non-passerine birds identified at sea, but not collected.

Galapagos Penguin, *Spheniscus mendiculus* Sundevall
 Sooty Albatross, *Phoebastria fusca* (Hilsenberg)
 Light-mantled Sooty Albatross, *Phoebastria palpebrata* (Forster)
 Giant Fulmar, *Macronektes giganteus* (Gmelin)
 Cape Pigeon, *Daption capensis* (Linnaeus)
 ? Bulwer's Petrel, *Bulweria bulwerii* (Jardine and Selby)
 White-faced Storm Petrel, *Pelagodroma marina*, subsp.
 Caribbean Man-o'-war Bird, *Fregata magnificens rothschildi* Mathews
 Man-o'-war Bird, *Fregata minor*, subsp.
 Flamingo, *Phoenicopterus ruber* Linnaeus
 Purple Gallinule, *Porphyryla martinica* (Linnaeus)
 Red-billed Gull, *Larus novae-hollandiae scopulinus* J. R. Forster
 Antarctic Tern, *Sterna vittata* Gmelin
 White Tern, *Gygis alba*, subsp.

The ornithological collection of the second Byrd Antarctic Expedition consists of one hundred and seventeen skins, chiefly of the larger oceanic birds. Twenty species are included, representing ten families, as follows:

Emperor Penguin, *Aptenodytes forsteri* G. R. Gray
 Adélie Penguin, *Pygoscelis adeliae* (Hombron and Jacquinot)
 Black-browed Albatross, *Diomedea melanophrys* Temminck
 Wandering Albatross, *Diomedea exulans exulans* Linnaeus
 Silver-gray Fulmar, *Priocella antarctica* (Stephens)
 Snow Petrel, *Pagodroma nivea* (Forster)
 Antarctic Petrel, *Thalassoica antarctica* (Gmelin)
 Peduncker, *Adamastor cinereus* (Gmelin)
 Galapagos Shearwater, *Puffinus l'herminieri subularis* Ridgway
 Wilson's Storm Petrel, *Oceanites oceanicus oceanicus* (Kuhl)
 Red-tailed Tropic-bird, *Phaethon rubricauda*, subsp.
 Blue-footed Booby, *Sula nebouxii* Milne-Edwards
 Masked Booby, *Sula dactylatra granti* Rothschild
 Spotted Cormorant, *Phalacrocorax punctatus punctatus* (Spartman)
 Galapagos Man-o'-war Bird, *Fregata magnificens magnificens* Mathews
 South Polar Skua, *Catharacta skua maccormicki* (Saunders)
 Brown Skua, *Catharacta skua lönnerbergi* Mathews
 Dusky Gull, *Larus fuliginosus* Gould
 Kelp Gull or Southern Black-backed Gull, *Larus dominicanus* Lichtenstein
 Panama Potoo, *Nyctibius griseus*

ALBATROSSES.—Throughout most of the year the Ross Sea is completely shut off from the open Pacific by a band of drifting ice as much as three hundred miles in width. This is the antarctic ice-pack, a purgatory for the navigator but a paradise for the observer of bird and mammal life. Unfortunately for the latter, no pack ice was encountered on our return voyage. However, this brought a measure of compensation in its effect on the southward occurrence of albatrosses, so that the known non-breeding ranges of three species were extended.

The most southerly wanderer of the Diomedidae is the Light-mantled

Sooty Albatross (*Phoebastria palpebrata*). The southernmost prior record of this bird is that of Dr. Edward A. Wilson, who died with Scott's sledging party on the return from the pole. In 1904, Wilson had observed this bird at 74° S. At the beginning of our return voyage a Light-mantled Sooty Albatross was patrolling our wake at 77° 50' S. Three days later, five Black-browed Albatrosses (*Diomedea melanophris*) joined us at a southward advance of 3.5 degrees beyond its former record. The stately Wandering Albatross (*Diomedea exulans exulans*) appeared at 68° 40' S.; its previous limit had been set at 67° S. by the naturalists aboard the 'Scotia' (Clarke, 1915, p. 267). These are advances of 230, 210 and 100 geographical miles, respectively, for the three species. If the albatrosses had followed a vessel southward into these high latitudes the position might not truly represent natural occurrence, but the birds were picked up on the northward voyage, with ours the only two ships in the entire Ross Sea.

On the southward trip the first albatrosses were met at 34° 3' S. These were the Wandering and the Black-browed Albatross. In the 'roaring forties' two male Wandering Albatrosses were collected, the larger weighing 19 pounds and measuring 10 feet 9 inches in extent.

SNOW PETREL AND ANTARCTIC PETREL.—We are here concerned primarily with the nine species of antarctic and sub-antarctic birds which were found in summer at the southern limit of the Ross Sea, along the Ice Barrier cliff. The Bay of Whales region marks the southernmost limit of eight of these species, a fact which lends increased interest to these records.

When an experienced ice-pilot in antarctic waters sights the first Snow Petrel he concludes that ice is not far away. The first part of its generic name, *Pagodroma*, means ice, its specific name, *nivea*, means snowy, and the bird itself is seldom found far from either ice or snow. This is the most abundant bird in the pack ice. It lives largely on the shrimp-like reddish crustacean, *Euphausia superba*, which is also the principal food of the Adélie Penguin, the Crab-eater Seal, and other denizens of the antarctic pack. The Snow Petrel's plumage is white with ivory tones; its beak, eyes, tarsi, and feet are black. This would be an altogether attractive bird were it not for its accuracy and eight-foot range in ejecting the oily, orange-colored contents of its stomach at the intruder.

After four months below the horizon, the sun reappears at the Bay of Whales on August 22. The earliest spring migrants are the Snow and the Antarctic Petrels. In 1929, a single Antarctic Petrel was seen October 2, but no Snow Petrels appeared until October 31. In 1934, a lone Snow Petrel and two Antarctic Petrels arrived October 6. In terms of the calendar this is analogous to the Bluebirds' delaying their arrival in the northeastern United States until the first week of April. The last Snow Petrel seen in the autumn was on March 13, after which no birds of any kind were seen.

Snow Petrels did not become common in the bay until December, or mid-summer, when they congregated by thousands on the sea-ice and barrier cliff near open water. A few habitually coursed back and forth along the higher ridges of pressure ice, where it was possible to collect them by hiding among the ice blocks. A tractor party returning to the base saw a Snow Petrel flying over the barren shelf ice forty miles from the sea. Though this is the southernmost recorded individual, several of Scott's sledging parties saw these birds seventy miles inland (Wilson, 1907, p. 90). The breeding habits have been observed by half a dozen different expeditions.

No birds breed in the Bay of Whales region. The only known breeding ground within four hundred miles is a rookery of Snow Petrels discovered by a four-man sledging party which Siple led into the mountain ranges of Marie Byrd Land. On the return trip through King Edward VII Land an ascent of Mount Helen Washington was made on December 19, 1934. A great flock of birds enveloped the summit of the peak, about one thousand by estimate. Both Snow and Antarctic Petrels were represented, in approximately equal numbers, and the presence of a rookery was suspected. On the lower slopes many bleached petrel bones were found in the profuse matting of lichens covering the rocks. As the summit was approached the bones became more numerous, and fragments of egg-shells were found. The birds began swooping at the heads of the two climbers. Finally, at the summit of the peak the rookery was located, where Snow Petrels were sitting on their eggs deep in crevices among the rocks. They defended their nests with the customary marksmanship. The eggs collected were found to be in the early stages of incubation. No nests of the Antarctic Petrel were found, but from the numbers of the birds it seems likely that they nest on this peak with the Snow Petrels. A fact of unusual interest is the distance of this nesting site from the nearest water. These birds nest fifty-one statute miles from their nearest possible source of food. This disadvantage seems to be counterbalanced by the nature of the peak, where many sheltered nesting sites are available among the loosely aggregated rocks. Winds of hurricane force sweep over the peak and prevent large accumulations of snow, while the dark rock contributes by absorbing the sun's heat and melting the snow. Finding this rookery extends the breeding range of the Snow Petrel $6^{\circ} 36'$ or 452 statute miles to the south.

In the ice pack in January flocks of hundreds of Antarctic Petrels were seen wheeling in unison above the great tabular bergs. About seventeen inches in length, or three inches longer than the Snow Petrel, this bird is no less handsome. Its chocolate-brown head, back, and wings furnish a pleasing contrast with the whiteness of the wing coverts and other parts. Our northernmost observation of it was at the same position as that of the Snow Petrel, $63^{\circ} 30' S$. Both species are circumpolar in distribution from the northern limits of the pack to the coasts of Antarctica.

In the Bay of Whales the Antarctic Petrel was much more common in 1929 than in 1934. Large flocks were seen frequently in the summer of 1929-30, but disappeared after the middle of January, and from then on even single individuals were very rarely seen. In 1934, no flocks of more than four were to be found in the bay, and the bird was uncommon throughout our stay there.

SILVER-GRAY PETREL (*Prionocella antarctica*).—This is the least common of the birds known to visit the Bay of Whales. In 1930, it occurred rather frequently among the large flocks of Antarctic Petrels early in January, but has not been recorded in the bay since that time. Our only specimen collected was secured on the antarctic circle and the 150th meridian, at the northern edge of the pack.

CAPE PIGEON (*Daption capensis*).—This petrel has never been reported in the Bay of Whales. Its southernmost record is at Discovery Inlet, 78° 30' S., where it was observed December 26, 1928, in the course of the first Byrd Antarctic Expedition. Apparently it had not been following the ship, for it paid little attention to it, and soon disappeared from sight.

WILSON'S STORM PETREL (*Oceanites oceanicus oceanicus*).—Breeding only on antarctic and sub-antarctic islands and on shores of the antarctic continent, this species migrates as far north as Labrador during the southern winter. As for all birds which reach the Bay of Whales, except the South Polar Skua, this station marks its southernmost limit. Wilson's Storm Petrel is frequent here in January and February, and may be seen ten miles back from the sea, careening over the flat bay-ice in a very swallow-like manner. We never saw them alight on the ice. Scott's expedition observed these birds flying over the shelf ice some sixty miles from open water (Wilson, 1907, p. 79).

GIANT FULMAR (*Macronectes giganteus*).—In summer during the second Byrd Expedition, after the sea ice at the mouth of the bay began to break up and float northward to join the pack, the Giant Fulmar or Giant Petrel was frequently seen soaring over the open water. This was not the case in 1928-30, however, for although several had appeared at Discovery Inlet, not one had been reported at the Bay of Whales until the autumn of 1933. The two stations are about eighty miles apart.

This species has two color phases, a brown and a white, with intermediate conditions. Wilson (1907, p. 96) pointed out that in proceeding southward the proportion of white specimens greatly increases. From 33° S. to 66° 7' S., he saw only one white bird in five hundred, while south of 66° 7' eighteen white and sixty dark birds were counted. Of about ten Giant Fulmars seen in the Bay of Whales in 1934-35, all were brown birds. None of these was seen at rest on the ice or flying over it, but always flying a few feet above the waves. In cruising along the barrier cliff between the Bay of Whales and

Discovery Inlet, we saw a flock of about fifty which had settled on an ice floe. Only two of these represented the white plumage phase. Although these two stations are at the very southernmost limit of the range, within the scope of our observations the white birds constituted only 3.3 per cent of the sixty individuals, as compared with Wilson's 23 per cent.

SOUTH POLAR SKUA (*Catharacta skua maccormicki*).—The drama of antarctic bird life is not without its villain. Theft and pillage, murder, cannibalism and infanticide, these crimes are all in the repertory of the South Polar Skua. The Adélie Penguin rookeries suffer heavily from its depredations. The Emperor Penguins are immune to this plague only because they nest in the middle of winter, sharing with no other bird species the rigor of the polar night. At the afore-mentioned Snow Petrel rookery there were skuas about. Doubtless the petrels' habit of laying their eggs in narrow crannies serves to protect the eggs and young from skuas, as well as from the force of frequent severe blizzards. It was not possible for the sledging party to remain in the region until the eggs hatched, but the bones scattered around the rookery probably bear witness to the work of skuas, at least in part.

At the summit of an unnamed peak near Mt. Saunders, the Marie Byrd Land party made a find which is unusual indeed in these latitudes. A small unfrozen fresh-water lake in the black sedimentary rock supported considerable plant and animal life. The muck bottom was pinkish in color due to innumerable red rotifers. There was a profuse growth of filamentous green algae in the pool, and the water had a stagnant odor. The moss, *Grimmia antarctica*, grew along the bank. The tarn served as the rendezvous of skuas, and a deposit of guano around it attested to long use of this haunt. A half-dozen skuas loitered about all day, bathing in the lake and resting on the rocks. Snow Petrel feathers and bones disgorged in definite pellets were scattered around the lake. Since this is 180 geographical miles from the Snow Petrel rookery in King Edward VII Land, it seems likely that the skuas had brought the remains of the young petrels here from as yet undiscovered rookeries on those hundreds of nearer peaks along the coast, which have never been visited by man. The date of this observation was December 3. No egg-shells or other evidences of nesting were found, but the abundance of the skuas in the general neighborhood suggests the proximity of a rookery. This mountain is thirty geographical miles from the coast. A similar 'robbers' roost' of the skuas was found at the summit of Mt. Saunders, 76° 47' S., and thirty-five miles from the nearest water.

The South Polar Skua wanders farther south over the continent than any other bird. Amundsen saw two of them on the Ross Shelf Ice at 84° 26' S., and Dr. Gould, in 1929, photographed one at the Queen Maud Range, 85° S. On the second Byrd Expedition, the southern geological party reported one

skua at $81^{\circ} 41' S$. However, the record of greatest interest is an observation made by this party at $86^{\circ} 05' S$, thirty miles up the Thorne Glacier, at an altitude over two thousand feet. The date was December 20, 1934, and the position 464 geographical miles from the nearest water and 235 miles from the pole. Here the men saw four skuas flying toward them from up-glacier, i. e., from the polar plateau, presumably. When the birds settled on the snow near the dog lines, the tethered dogs went into a frenzy at the sight of them. The birds rested for a time and finally took off, flying north, continuing the flight down the glacier. These facts suggest that the skuas may have been on a flight across the antarctic continent.

There is one still more southerly bird record, though the circumstances seem rather less suggestive. Captain Scott on his last journey wrote in his diary, January 2, 1912: "One skua gull visited us on the march this afternoon—it was evidently curious, kept alighting on the snow ahead, and fluttering a few yards as we approached. It seemed to have had little food—an extraordinary visitor considering our distance from the sea." This was on the plateau, at an altitude of 9,980 feet. The position was $87^{\circ} 20' S$, or 160 geographical miles from the south pole, and 560 geographical or 640 statute miles from the sea.

Soon after the Byrd Expedition arrived at the Bay of Whales, numbers of Weddell Seals were being killed for dog food. At the time when our search for a seal embryo was first rewarded, the specimen was left lying on the sledge while preservative was being prepared. A sudden swift rush of wings, then skua and embryo were making for the horizon. On another occasion the thieving nature of the skua was accidentally sublimated into usefulness. We were attempting to collect fish by dynamiting from a small boat in open water. A current from beneath the ice, however, apparently carried most of the victims far out to sea before they floated to the surface. After shooting eighty sticks of dynamite at various depths, we had secured only two small specimens of *Pleurogramma antarctica*. A skua was then seen flying in from sea with a fish in its beak. While it alighted on the ice to devour its find, we rowed ashore and rushed toward it with wild shouts, so that it flew off, abandoning the scarcely damaged fish. Two other skuas were seen carrying fish ashore that day, whereas throughout both expeditions only one other case of a skua with a fish was observed. The only items in the stomachs of skuas we collected were pebbles, the blubber, flesh and hair of seals, flesh and bones from skua carcasses that we had skinned, and cuttle-fish beaks.

The first springtime arrival of skuas in the Bay of Whales was on November 9, when three appeared. They were common during December, January, and February. The last autumn record for them was March 13, when the temperature had been dropping to $-30^{\circ} F$. for a week. Eighteen

specimens taken in the middle of December were equally divided between the sexes, and the gonads of both evidenced reproductive activity.

ADÉLIE PENGUIN (*Pygoscelis adeliae*).—After twelve days of cruising eastward through pack ice and bergs, we saw the first Adélie and Emperor Penguins at 68° S. and 124° W. The Adélies were the more abundant of the two. Both adult and immature birds of each species were seen. The immature Adélies greatly outnumbered the adults, and two seen January 2 carried the remnants of their down plumage. This is remarkable, for Wilson (1907, p. 58) found that the nestling down is moulted *at the rookery* between January 9 and 16. The two white-throated young in question were on a large ice-pan 180 miles north of the nearest possible unknown coast line. They were not seen to enter the water. Perhaps they were carried away accidentally from the vicinity of the rookery with the break-up of sea ice along the shore, and were finishing the moult on floating ice as the Emperor Penguin chicks do in the spring during their ride north to the pack. Even so, January 2 would seem to be unusually early for the last of the down to be shed. This occurrence may indicate the presence of a rookery near the 115th meridian, and probably to the east of it since the ocean current is westward-flowing along these coasts.

The white-throated immature plumage is carried for thirteen months, and is replaced by the black-throated adult plumage in the latter part of February of the bird's second year. Only birds in the adult plumage migrate south to the rookeries in the spring. The black-throated birds which we find in the pack in early January are obviously not breeding. These may be third-year birds remaining in the pack for another year after acquiring the adult plumage. If so, as Wilson (1907, p. 58) has suggested, it follows that the penguins are three years old before they breed.

In the Bay of Whales the earliest spring record is a specimen taken November 14, 1934, nine days after the first Emperor had arrived. Both species are merely visitors in the bay, for their nearest known rookeries are at Cape Crozier, 400 miles to the west. Not another Adélie was seen until January 5. After this date they appeared occasionally in the bay in groups of from two to four, but only one such group was seen at a time. In fact, throughout the summer's work in the Bay of Whales, only fourteen Adélies were seen here in all. Yet at Discovery Inlet, eighty miles to the west, they were numerous after the middle of January. Some of the latter were presumably from a rookery, for the gonads were enlarged. The relative abundance at the two stations also suggests that the birds had come from the rookeries west of us, and that most of them go ashore at Discovery Inlet, only a few continuing to the Bay of Whales. It also may indicate the absence of any rookery along the equivalent four hundred miles of coast to the east, the more strongly because the westward-flowing coastal current

would favor movement of birds toward the bay from the east, while opposing it from the west.

With a single exception, all the Discovery Inlet specimens were in the adult plumage. The one immature bird was in the bleached and weathered white-throated plumage, ready to moult soon into the black-throated adult plumage. Such birds are not to be found in rookeries, but are met with in the pack ice. The fact that this year-old bird, which had spent the previous winter in the pack, was on the continental coast in January, suggests the possibility that some of the black-throated birds collected with it were also birds which would normally be in the pack at the time, and had come from there rather than from any rookery. These would then correspond to the black-throated non-breeding Adélies which we saw in the pack along the antarctic circle in January. Instead of remaining in the pack to moult with their fellows, they had wandered perhaps eight hundred miles to the south to moult in the security of a sheltered bay along the Ross Ice Barrier.

Of the twenty-seven specimens taken in January on the coast, ten were females and seventeen were males. The mean total length of twelve males was 29.0 inches, and of seven females, 26.9 inches. The weight of twelve males ranged from 7.5 to 10 pounds, averaging 8.5 pounds. Three females averaged 8.2 pounds. Wilson (1907, p. 43) states that a collection of small pebbles is invariably found in the stomach. This does not apply to birds in the moult, which are fasting since they dare not enter the water. Most stomachs examined contained from one to ten pebbles each, but six stomachs were completely empty.

In 1929, the white-throated juveniles were not uncommon in the flocks of adults. The largest group of Adélies we saw at any one time was a compact flock of 85 adults on the sea ice at Discovery Inlet.

EMPEROR PENGUIN (*Aptenodytes forsteri*).—These largest of living penguins were more frequent visitors to the Bay of Whales than the Adélies in 1934-35, but the reverse was true in 1929-30. Their remarkable habit of breeding during the extreme cold and darkness of the antarctic night leaves them free in summer to wander along the coast and through the ice pack. Many Emperors are to be seen in the pack during December and January, both juvenile and black-throated birds. Others of both groups seek coastal bay ice, such as the Bay of Whales affords, on which to moult.

Although conspicuous by virtue of their size, coloration, and loud, reedy, whining call note, Emperors are by no means abundant in the bay. Throughout the summer of 1934-35, though we were on the bay almost daily for three months, the total number of Emperors seen was only thirty-two. The first in the spring appeared November 5, after which none was seen for a month. On the first expedition they were even less commonly found.

An Emperor was found starting to moult as early as December 5. The

birds avoid the water and take no food during the moult, which lasts nearly one month. Eighteen specimens taken in November and December, before the moult, ranged from 60 to 84 pounds, while eleven taken after the moult, in February, ranged from 39 to 55 pounds. The mean weight before the moult was 70.1 pounds, and after the moult, 49.8 pounds. Some taken in the latter part of December had already completed the moult and were feeding. Their stomachs contained fish and *Euphausia* remains, and usually pebbles, though not invariably. The pebbles had undoubtedly been secured elsewhere, for no land is exposed within one hundred miles and the sea is 1800 feet deep beneath the bay ice. Sixty-eight grams was the maximum weight of pebbles found in one stomach; the largest pebble weighed six grams. Selater (1888, p. 325) reported pebble masses from two to ten pounds in weight. They rest remarkably far down, since the lowest part of the greatly elongated stomach reaches nearly to the base of the body cavity. The weight of pebbles at this point lowers the penguin's center of gravity and possibly helps it to some extent to maintain its upright posture on the ice. This may also serve as ballast when diving, as Murphy (1936, p. 364) has suggested.

Only two of the Bay of Whales Emperors were in juvenile plumage. These individuals were about seventeen months old and soon to assume the adult coat. Four such birds caught at Discovery Inlet moulted into the adult plumage while in captivity. All of the juvenile Emperors seen along the coast were over one year old.

The pupil of the eye is capable of great change in size in relation to light intensity. In the bright sunlight of the antarctic summer the pupil is less than a millimeter in diameter. The iris is dark rufous in color. The shapes which the pupil assumes at different apertures are similar to those of the King Penguin (*Aptenodytes patagonica*) as described by Murphy (1936, p. 343). At a moderately small aperture the Emperor's pupil is distinctly square, and in closing further the corners become more sharply defined. Finally, when less than three or four millimeters in diameter, the pupil shows very sharply attenuated corners, since the iris bows inward from the four sides. The characteristic call note is given by both sexes.

A dog-team driver on the trail east of the base saw an Emperor's tracks fifteen miles south of the coast in the first week of January. The penguin was heading south, on the high shelf ice. Such wanderings are typical of the moulting period. It is not probable that this bird was lost, for we found that captive penguins released on the barrier surface were able to head accurately in the direction of the nearest water, possibly by a reaction to the dark band of 'water-sky.'

These penguins displayed apparently intelligent behavior when a group of them skirted the edge of the high barrier cliff in an effort to find a way

down into the water. One or two of the flock would drop down on their bellies and toboggan up to the edge. After peering over and finding a precipitous sixty-foot drop, this advance guard would turn directly about and slide back to the flock which had remained at a distance of twenty feet from the edge. Here the birds would again stand up on their feet and the whole group would waddle along parallel to the edge forty feet or so, when the whole performance would be repeated. This continued for miles, and was observed with different groups of Emperor Penguins. Those who have seen the barrier edge calve off into the sea under the slight weight of man or dogs might be prone to attribute to the penguins a realization of this danger. This anthropomorphic interpretation fits well with the popular idea of the birds' cleverness. The ornithologist, however, might reach either of two conclusions. Since antarctic seas are filled with great tabular icebergs, merely loose pieces of shelf ice derived from the Ross Barrier or similar formations, it would seem probable that penguins find sloping edges and make their way to the top, later following along the steep edge in search of the same or another route back down. An instinctive fear of high and steep places would have survival value and be implanted in the race through a long period of selection. Or, again, it might be concluded that some or all of these birds had been conditioned by personal experience with unstable overhanging snow cornices on a smaller scale, or had been blown by high winds off the edges of ice cakes, particularly when walking or standing erect. These possible explanations, however, seem unnecessarily elaborate. Consider the approach of a flock of Emperors toward a man or a dog team. They come up to within fifty or sixty feet, some walking, others tobogganing. Then they stand erect in a curious yet cautious group while one of them slides along on its belly to investigate, approaching to within ten feet or less of the strange object. After some trumpeting, bowing and scraping, it returns to the group. Another bird may then carry out the same procedure, or its curiosity satisfied, the flock may resume its leisurely walk. If man or dog advances menacingly, however, all the birds at once drop to their bellies and skitter off at such a pace that a man running full tilt is hard put to overtake them. It seems, then, that the Emperor Penguin when out of water reacts in the same way toward any object of curiosity and potential danger, such as man, tractor, or the more usual problem of the steep edge of the ice. Their habit of approaching such situations on their bellies shows an apprehensive state of 'mind'. They are prepared for a quick retreat if the edge of the ice begins to crumble or in case of attack by natural enemies such as the Sea-leopard (*Hydrurga leptonyx*). Danger from the latter is confined largely to the water, however (Levick, 1914, p. 84).

After an unsuccessful attempt on the first Byrd Expedition to bring back

living antarctic penguins for American zoos, another attempt was made on the second trip. The captives were kept at the base camp, where an area of about 5000 square feet of snow was enclosed by a wire netting. The first birds caught were kept here for two months before being transferred to the ship. Frozen fish had been purchased in New Zealand for feeding them. This was thawed in water and cut into strips of convenient size with the larger bones removed. The birds were fed once a day, and care was taken not to overfeed them, since some were moulting. Because the penguins were unable to recognize dead material as food, and were unwilling to accept the hospitality of their captors, forcible feeding was necessary. This required two men, one to catch the bird, overpower it and hold it down, another to pry open its beak and administer the food, piece by piece. At the end of two months one of the flock, an Emperor, had become reconciled to eating, and would open its beak for food.

On leaving the Antarctic we had twenty-one captive Adélies and nineteen Emperors housed amidships in an air-conditioned, refrigerated, cork-insulated room forty feet long, six feet wide, and seven high. Half its length was given over to a concrete tank of cooled sea water three feet deep. Air was pumped down from the masthead and cooled by passing through a large honeycomb coil of ammonia veins. On the cooler days the birds were taken out to a canopy-covered enclosure on deck for a chance to dry their feathers, since the necessity of continually washing down the room kept it too humid and the penguins were sometimes unable properly to dry themselves. After three weeks at sea, when the birds had been kept for two or three months in captivity, most of the Emperors no longer required forcible feeding. On the contrary, they had become very tame and friendly, since a new association had finally been formed and man now symbolized food. The task of feeding them was scarcely lightened on this account, for their greedy shoving and squabbling over each piece of fish created new difficulties. The fact that a very few of the adult birds ultimately learned to pick up food from water in a pan did not facilitate the feeding, because of their clumsiness and slowness in trying to feed themselves. The young Emperors were far behind the adults in their conditioning to hand feeding, and were more vicious in defending themselves against being fed. The Adélies showed still less adaptability and more pugnacity. Their stout hooked beaks proved much more formidable weapons than the long, curved bills of the Emperors. If the powerful Emperors had fought as strenuously in proportion to size, keeping them alive would have been quite impossible.

Unfortunately for the captives, the return voyage to America took more than three months due to the slow pace of the ships and an extended stay in New Zealand, where many of the Adélies died. By the time the expedition

had crossed the tropics, nine of the Emperors had died from a heavy mycosis infection of the lungs, tracheae, and air sacs. Ten Emperors and one Adélie Penguin reached the United States alive and were delivered to the Chicago Zoological Society. The last of these died about two months later of the same disease. The Society transferred these birds to the Field Museum of Natural History, where they are now on display as a habitat group.

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A NONDESCRIPT BLACKBIRD FROM ARIZONA

BY ALLAN BROOKS

THE capture in North America of a bird that cannot be assigned to any known species or even genus is a noteworthy event and while it is inexpedient to describe a species from a unique specimen, still there can be no harm in publishing its characters in the hope that such a record may lead to a more thorough exploration of the general region where it was taken so that further specimens, if existing, may be procured.

The bird in question, now in the U. S. National Museum, is a rather large, wholly black individual of the Icterine family that was taken by the late J. E. Law and the present writer at a large tank overgrown with cat-tails on the ranch of Mr. L. C. Way some nine miles south of Mammoth, Arizona, on March 15, 1928. It was associated with a large flock of Red-winged Blackbirds (*Agelaius phoeniceus sonoriensis*), mostly males; these were not breeding at that time.

When we arrived at Mr. Way's ranch on March 14, the bird was casually identified as a Brewer's Blackbird although it looked very large for that species. On the following day a good opportunity to examine it with an eight-power binocular at once proved it to be a new bird; the dark brown iris and the strong Quiscaline bill were evident. We at once assumed that here was a straggler from the South and we were pledged not to collect or to fire a gun anywhere in the neighborhood of this tank! Our host would not return until the evening so we had to be content with following the bird about and noting its characters and actions.

Mr. Way arrived before sunset and readily gave his consent to a violation of his sanctuary. Law shot the bird and with the same shot dropped two male Redwings which had seemed to be clear of the radius of the charge. Unfortunately the tip of the upper mandible was shot off but its contour had been well noted before in life.

In the hand the bird proved to be about the size of a male Yellow-headed Blackbird with the following measurements and characters: male; organs much enlarged, of the same size as in the two Redwings killed at the same time; iris dark brown (sepia); bill and feet black; entire plumage black, slightly glossed with bluish purple, wings and tail more greenish; upper tail coverts falling short of the tip of tail by 60 mm.; tail with thirteen rectrices, strongly graduated, the outer feathers 20 mm. wide, falling short of the central pair by 32 mm., in form quite flat without trace of plication; wing pointed much as in *Agelaius*, first four primaries of almost equal length, formula 4-3-2-1-5 (from outer primary). Bill: culmen slightly curved, top

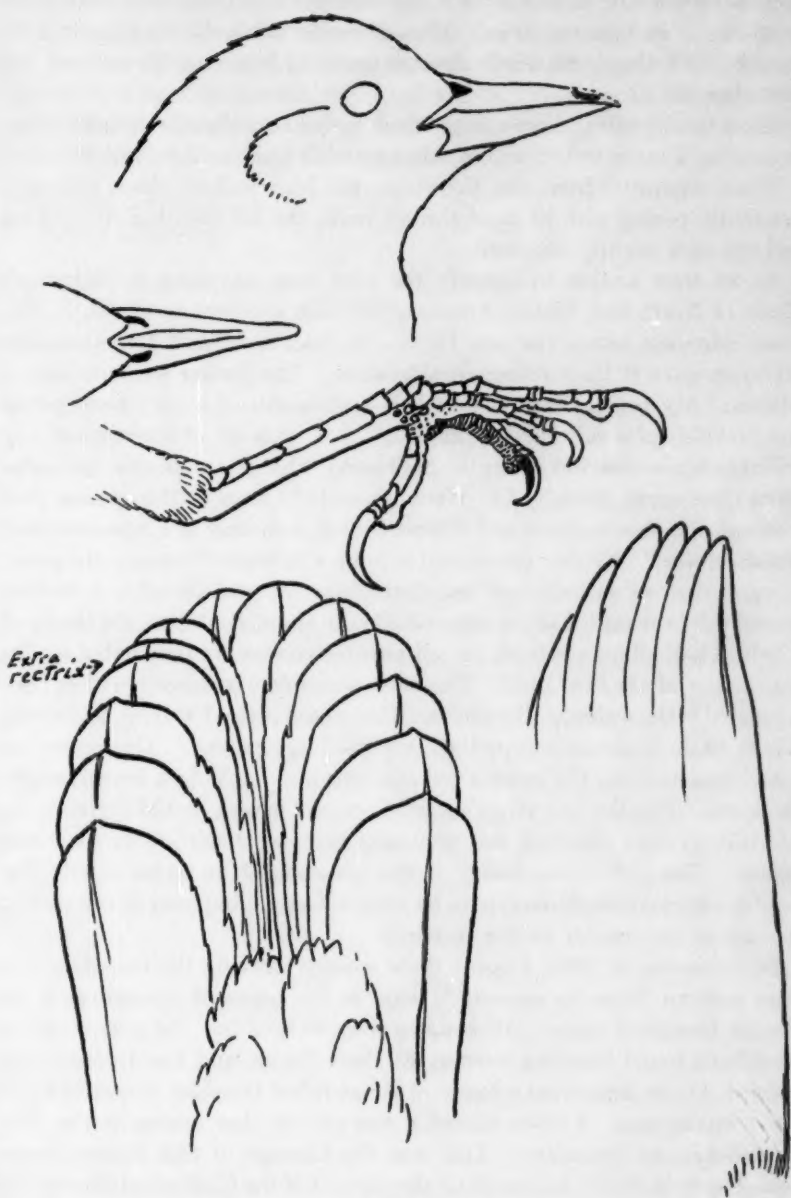


FIG. 1.—Structural details of a nondescript Blackbird from Arizona. $\times 0.87$.

flattened medianly, palate as in *Holoquiscalus*. Feet large and stout with short tarsus and strong claws. Measurements: wing, 150 mm.; tail, 126; culmen (tip broken), 29; depth through nares, 12.5; tarsus, 37; mid-toe, 29; with claw, 37.

When freshly killed the plumage of the body had a slightly ribbed texture suggesting *Tangavius* and with a velvety rather than a silky surface.

When separated from the Redwings, the bird walked about sedately, frequently posing with its head thrown back, the bill pointing straight up and the neck slightly extended.

As we were unable to identify the bird from anything in Ridgway's 'Birds of North and Middle America,' the skin was sent to the U. S. National Museum where the late Dr. C. W. Richmond and Dr. Alexander Wetmore gave it their fullest consideration. The former wrote to me as follows: "My present idea is that it is a *Quiscalus* of a very new species and probably of a very limited range . . . it is out of the range of any ordinary *Quiscalus* but there is no reason why an unknown *Quiscalus* should not occur there." Dr. Wetmore said: "I lean to the opinion that someone will obtain others and demonstrate it definitely as a new species of *Holoquiscalus*." Neither considered it to be a hybrid. To many the possibility of such an entirely new and distinct species (and probably a distinct genus) will be regarded as an impossibility; to these, doubtless, the theory of a hybrid will afford a refuge, but all possible crosses are discounted by the appearance of the bird itself. The most plausible parentage that has been suggested is *Quiscalus* \times *Tangavius*. This would present several difficulties. Where do these species occupy the same breeding territory? The former has a straw-colored iris, the latter a red one; this bird has a dark brown, nearly black iris. Finally, the offspring of divergent genera would certainly be infertile, whereas this bird was very near breeding condition by its sexual organs. The only abnormality is the presence of an extra rectrix but careful examination shows this to be a freak feather, imposed in the normal spacing of the regular twelve rectrices.

In the spring of 1933, I spent three months working the boundary line from western Texas to eastern Arizona in the hopes of encountering the strange blackbird again. All swamps were worked but the only all-black blackbirds found breeding were at El Paso, Texas, and Las Cruces, New Mexico, where there were colonies of Great-tailed Grackles (*Cassidix mexicanus mexicanus*). I twice visited a fine swamp that intersects the New Mexico-Arizona boundary. This was the Cienega of San Simon; many years before in 1913 I had stood on the summit of the Chiricahua Mountains in eastern Arizona and noted the long patch of misty green in the desert to the east and determined some day to investigate it. Twenty years later the opportunity came and here I hoped to encounter my stranger. But the

only blackbirds were Redwings, but not the subspecies that accompanied the nondescript of the San Pedro valley; the San Simon birds were *nevadensis*. So somewhere in the breeding grounds of the Sonora Redwing some collector may turn up the subject of this article. Was not an entirely new species of jay, *Cyanocorax dickeyi* Moore, discovered recently in a well-worked district of Sinaloa by Chester C. Lamb?

*Okanagan Landing,
British Columbia*

RECENT OBSERVATIONS ON THE IVORY-BILLED
WOODPECKER

BY ARTHUR A. ALLEN AND P. PAUL KELLOGG

Plates 9-15

INTRODUCTION

DURING the spring of 1924 it was the good fortune of the senior author and Mrs. Allen with an able guide, Mr. Morgan Tindle, to discover in Florida a pair of nesting Ivory-billed Woodpeckers, *Campephilus principalis* (Linnaeus). Since it is our belief that more is to be gained from a study of the living bird than from a series of museum specimens, we refrained from collecting the birds and planned our itinerary so as to spend the greater part of the following month studying them. Unfortunately our observations were interrupted by the activities of two local taxidermists who thought 'a bird in hand is worth two in the bush' and collected the birds during our absence. Again, in 1935, the Brand-Cornell University-American Museum Ornithological Expedition was unusually fortunate in Louisiana, with the assistance of Mr. Mason Spencer and Mr. J. J. Kuhn, in locating several nesting pairs of Ivorybills, and we were able to make somewhat more continuous observations on the birds. These observations were interrupted through natural causes which throw some light on the birds' 'struggle for existence' and help to explain their present rarity and gradual disappearance. The habits of the birds studied in Louisiana differed somewhat from those watched in Florida, and some of our observations are at variance with those published by others, so that it seems wise at this time to present the observations and deductions thus far made rather than to wait for an opportunity to complete the life-history study. There are doubtless others more conveniently located or with more time or facilities to carry forward this study, and with the thought of assisting such observers our observations are presented herewith.¹

DISTRIBUTION

According to the A. O. U. Check-list (1931), the Ivory-billed Woodpecker occurred formerly in "the South Atlantic and Gulf states from Texas to North Carolina, north in the Mississippi Valley to Oklahoma, Missouri, southern Illinois, and southern Indiana; now greatly restricted; reported as occurring locally in small numbers in central Florida, and possibly in

¹ Since this was written the National Association of Audubon Societies has established a fellowship at Cornell University, the recipient of which, Mr. James Tanner, is now undertaking this special study.

southern Missouri, southern Mississippi, and Louisiana." This does not give one very important fact in the distribution, namely, that the birds are non-migratory and moreover they are probably sedentary. It is our belief that most individuals spend their entire lives within a few miles of the place where they are hatched and develop little Ivorybill communities. These, when left to themselves, may develop such local abundance as reported by early observers and give a wrong impression of the general status of the species. On the other hand, one not knowing the exact whereabouts of one of these communities might search for days in suitable forest cover within a few miles of the right spot without discovering the birds.

The birds which we discovered in Florida were within a mile of the place where a hunter reported having seen three and shot one three years before. The birds discovered in Louisiana in 1935 were apparently close to the spot where Beyer (1900) reported collecting seven specimens nearly forty years previously; the place had been known to local residents for fully as long and had been reported by Pearson in 1932. On the other hand, failure to find the birds in a given area is no proof that they are not there, for they are not noisy except when disturbed; their voice does not carry nearly as far as that of the Pileated Woodpecker and in the big trees which they normally frequent they are easily overlooked. We camped for five days within three hundred feet of one nest and, except when the birds were about to change places on the nest or were disturbed, seldom heard them. We had great difficulty in following them through the woods to learn their feeding habits even after becoming very familiar with their notes. The senior author at one time stood under a giant oak and caught in his hand chips of bark and wood that an Ivorybill was scaling from a dead branch high in the tree without either one being able to see the other. We had hunted for three days for this particular pair of birds without ever hearing them, even though we were frequently within three hundred yards of the nest, which we finally found because we happened to be within hearing distance when the birds changed places on the nest. This same sedentary habit, once a community has been located by collectors, has made it possible in the past to exterminate local groups of Ivorybills, and this may well have happened even in the name of science.

One nest which we found was within one hundred yards of another discovered by our guide the year before, and Maurice Thompson (1885) was shown a pair nesting in the same dead pine stub where they had nested the previous year. Ridgway (1898) reported finding two occupied nests in Florida within two hundred yards of each other. We did not discover nests so close together as this, but three pairs were nesting within a radius of two miles.

FEEDING RANGE AND FOOD

We were never able to follow a bird continuously through the forest of either Louisiana or Florida for more than an hour before it would make a long flight and we would be unable to find it again. Ordinarily upon leaving the nest-tree or its immediate environs the bird would fly at least a hundred yards before stopping. Then it would feed for from a few minutes to as long as half an hour on a dead tree or dead branch before making a short flight to another tree. It might make a dozen such short flights and then, without any warning and for no apparent reason, it would start off on a long flight through the forest that would take it entirely out of sight.

Audubon (1856) states that "it seldom comes near the ground"; but the birds we have watched behave no differently from Pileated Woodpeckers in this respect, sometimes working high up in the trees but at other times within five or ten feet of the ground. The female of the Florida pair which we watched for over an hour on a 'burn' sometimes got down on the ground around the seared, prostrate trunks of the saw palmettos, hopping like a Flicker, while her mate stayed on the trunks of the pines five to ten feet up. We never saw the Louisiana birds on the ground but there was plenty of evidence, both in Florida and Louisiana, that a bird will continue scaling the bark from recently killed trees for the engraver-beetle larvae beneath, clear to the base of the tree, until the tree stands absolutely naked with the bark piled around its base.

Frequently they return again and again to the same tree until they have entirely stripped it. At one time we thought this was their chief method of feeding, but we have since watched them digging for borers exactly like Hairy or Pileated Woodpeckers. At one time we watched the female working at a deep gash in the tall stub of a dead gum, which was apparently a favorite feeding place. She clung to the spot for about five minutes, occasionally picking hard, but never chipping off any large flakes that would account for the depth of the hole which was exactly like that made by Pileated Woodpeckers,—about four inches deep and eighteen inches long. Finally she flew and disappeared in the direction of the nest which was about two hundred yards away. In a few minutes the male Ivorybill came to the same spot where the female had been working and he, too, picked at the hole and stayed there for several minutes. At the time we decided that either the Ivorybills or perhaps the Pileateds had made the gash in the tree for carpenter ants and that the Ivorybills were returning each time for more ants. Since the stub was rather rotten and full of woodpecker drillings, we decided to cut it down the next day and make certain of what the Ivorybills were securing. Upon examining the hole made by the birds there was, however, no evidence of carpenter ants, and the deep gash followed the tunnels of large, wood-boring beetle larvae (*Cerambycidae*) of which there



"CAMP EPHILUS" WITHIN 300 FEET OF THE IVORY-BILLED WOODPECKERS' NEST



THE SENIOR AUTHOR TAKES HIS TURN AT OBSERVING WITH 24-POWER BINOCULARS



were a great many in the tree; the only other available woodpecker food was termites of which there were comparatively few.

Certainly the Ivorybills did not do enough digging while we were watching them to uncover any additional borers, so they may have been picking up such termites as appeared in the gash. The birds, while we watched them in Louisiana, divided their time between dead branches of live trees and completely dead trees, but more time was spent knocking off the bark for whatever could be found immediately beneath it than was spent digging deeply for borers. The forest was made up primarily of oak, gum and hackberry, and the woodpeckers showed no preference for species so far as we could determine. In Florida, while the nest was located in a cypress swamp in a live cypress tree, the birds apparently did most of their feeding in the dead pines at the edge of the swamp, scaling off the bark of those small and medium-sized pines that had been killed by fire, or actually getting down on the ground like Flickers, as already described.

Audubon (1856) mentions grapes, persimmons and hackberries as food of the Ivorybills in addition to beetles, larvae and large grubs; McIlhenny in his communication to Bendire (1895), mentions their feeding on acorns. Apparently they are fully as adaptable as other woodpeckers in their food and feeding habits, even though Maurice Thompson (1885) asserts that it "is the only Woodpecker which eats insects and larvae (dug out of rotten wood) exclusively," so that we shall have to look in other directions for reasons for their disappearance. Of course, if they do not range far, they might well be restricted to forest of mature trees rather than second growth where there would be plenty of insects in dead timber as well as fruit on which to feed. Lumbering operations might therefore be a prime factor in their disappearance.

COURTSHIP

Nothing seems to have been written concerning the courtship of the Ivorybill and our only observations were made in Florida about 6.00 a. m., on April 13, 1924. We had discovered this pair of Ivorybills at about the same time the preceding morning when they came out of the cypress swamp and preened their feathers and called a few times from the top of a dead pine before going off together to feed. They had made such a long flight the previous day that we were unable to find them again, but that night, still traveling together, they had returned to the same group of medium-sized cypress trees which they had apparently left in the morning and in which there was one fresh hole in addition to four or five other old ones in the near vicinity. On the morning of the 13th, they called as they left these cypress trees and flew to the top of a dead pine at the edge of the swamp where they called and preened. Finally the female climbed up

directly below the male and when she approached him closely he bent his head downward and clasped bills with her. The next instant they both flew out on to the 'burn' where we followed their feeding operations for about an hour.

NESTING

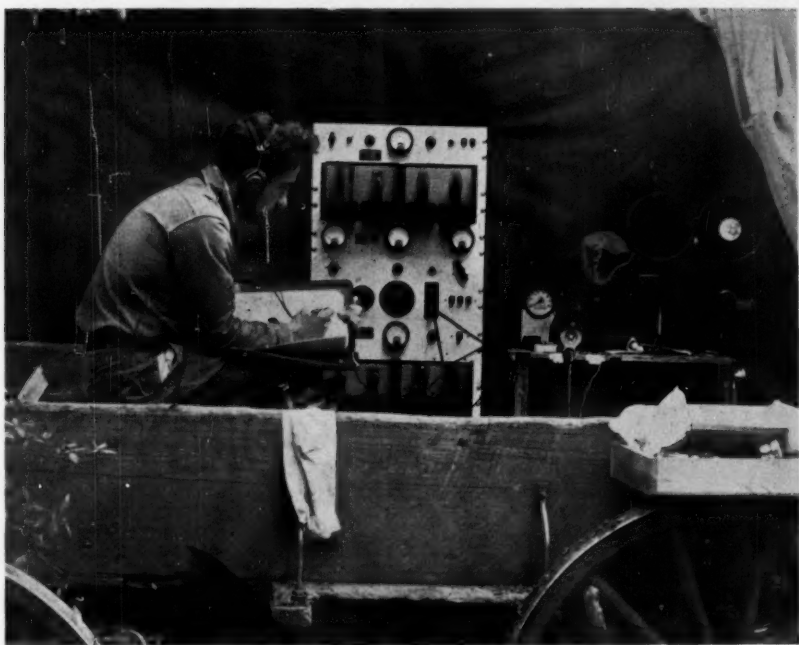
According to Audubon (1856), "The Ivory-billed Woodpecker nestles earlier in the spring than any other species of its tribe. I have observed it boring a hole for that purpose in the beginning of March." The only definite record of a March nesting that we find, however, is that of Scott (1888) of a nest in Florida containing one young female about one-third grown March 17, 1887. Scott (1881) likewise reports taking an incubating female in Florida, January 20, 1880. Ridgway (1898) spoke of shooting a male that left its nest-hole February 15, 1898, but he did not examine the nest, which was 65 or 70 feet up in a cypress, to determine whether eggs had actually been laid. The most definite records, as reported by Bendire (1895) seem to be for April and early May, as follows:

- April 6, —. M. Thompson, Okefinokee Swamp, Ga. Laying
- April 9, 1892. E. A. McIlhenny, Avery Id., La. 3 fresh eggs
- April 10, —. Dr. S. W. Wilson, Altamaha Swamp, Ga. 4 eggs
- April 15, 1893. A. Wayne, Florida. A young female about 2 weeks out of the nest
- April 19, 1893. Ralph Coll., Lafayette Co., Fla. 3 eggs
- May 2, 1892. E. A. McIlhenny, Avery Id., La. 3 eggs
- May 19, 1892. E. A. McIlhenny, Avery Id., La. 4 eggs, a second laying
- May (early) 1894. E. A. McIlhenny, Avery Id., La. 5 young, three days old
- May 3, 1885. Capt. B. F. Goss, Jasper Co., Texas. 3 eggs

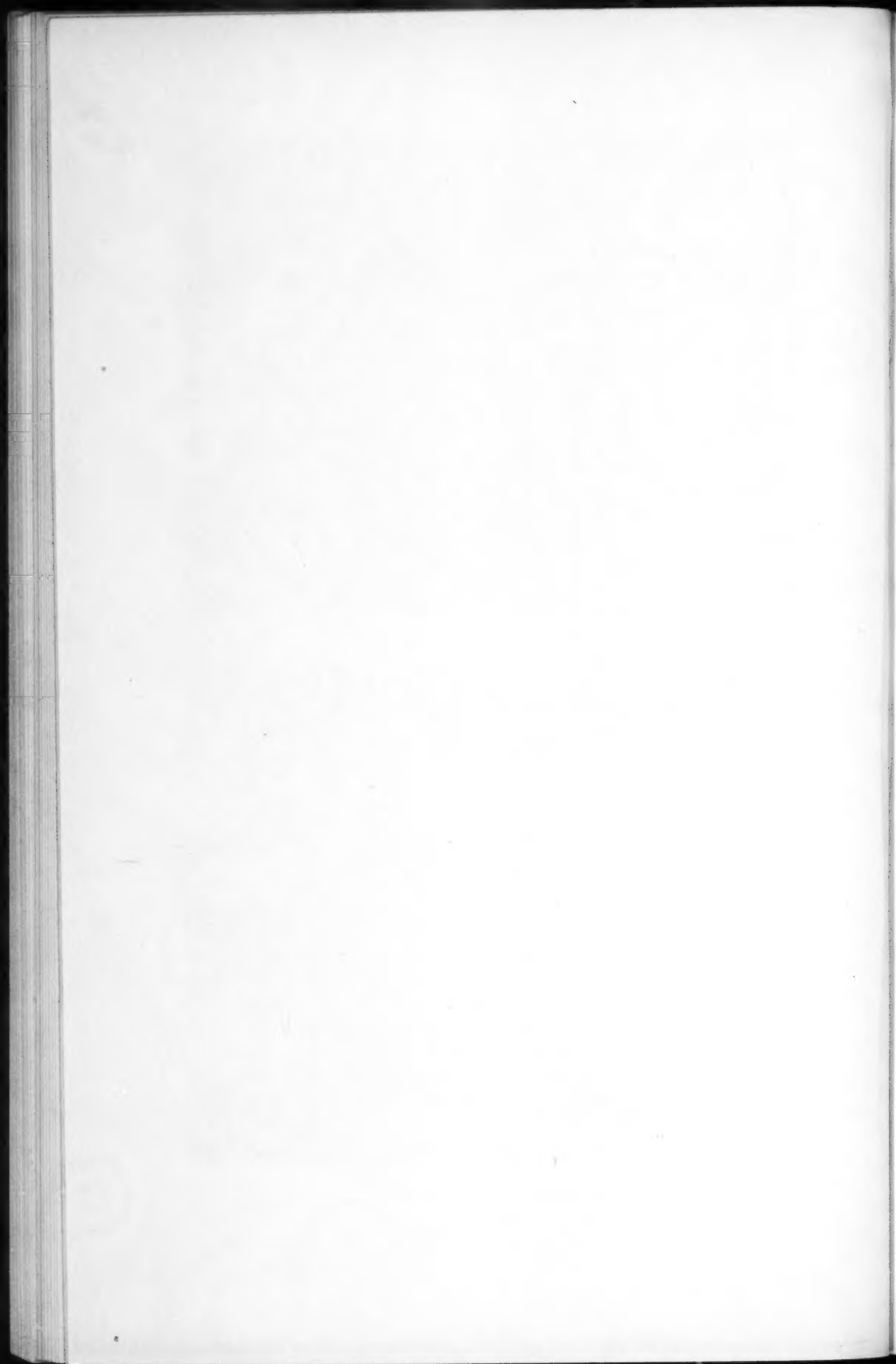
To these dates we can add, from personal observation:

- April 13, 1924. Taylor Creek, Florida. Nest completed. Incubation not yet started
- April 6, 1935. Northern Louisiana. Incubating
- April 9, 1935. Northern Louisiana. Building
- April 25, 1935. Northern Louisiana. Incubating
- May 10, 1935. Northern Louisiana. Small young
- April (early) 1931. Northern Louisiana (J. J. Kuhn). Incubating
- May 13, 1934. Northern Louisiana (J. J. Kuhn). Probably small young

The site of the Ivorybill's nest seems to vary considerably. Audubon (1856) states: "The hole is, I believe, always made in the trunk of a live tree, generally an ash or a hackberry, and is at a great height." There are, however, records of their nesting in live cypress, partially dead oaks, a dead royal-palm stub, "an old and nearly rotten white elm stump," etc., indicating about as great a variety as shown by the Pileated Woodpecker. The lowest authentic nest of which we have found a record, was that described by Beyer (1900) "about 25 feet up in a living over-cup oak," although Scott



THE 'ELECTRIC EAR' AIMED AT THE IVORYBILLS' NEST BY JAMES TANNER, WHILE THE BIRDS' CALLS ARE RECORDED ON FILM BY THE JUNIOR AUTHOR IN THE WAGON-BOX 'LABORATORY' BELOW



(1881) mentions what he considered "an old nest evidently of this species," in a palmetto stub only fifteen feet from the ground. The nest which we discovered in Florida, in 1924, was about thirty feet up in a live cypress and there were other holes in the vicinity in similar trees that had apparently been used in years past. The bark had healed over in some cases and scar tissue was apparently trying to close the wounds. Of the four nests examined in Louisiana, three were in oaks and one in a swamp maple. The maple, seven and a half feet in circumference (breast high), was partially alive, but the top where the nest was located, 43 feet from the ground, was dead and pithy. Of those in oak trees, one was in a dead pin-oak stub about ten feet in circumference and about fifty feet high, standing in more or less of a clearing. The nest was 47 feet 8 inches from the ground. The other two were not measured accurately but were certainly over forty feet from the ground. About the middle of May when it was determined that the first two trees had been deserted, they were cut down, careful measurements taken, and the contents of the holes preserved. The hole in the maple was 5 inches in vertical diameter and $4\frac{1}{8}$ inches laterally, and was slightly irregular at the bottom, as shown in the photographs; that in the oak was more symmetrical with a similar vertical diameter of 5 inches and a transverse diameter of 4 inches. The depth of the maple nest from the top of the entrance hole was $19\frac{1}{8}$ inches, of which 3 inches was filled with chips and 'sawdust.' This nest cavity was $8\frac{1}{8}$ inches in diameter at the egg level, and the tree itself $18\frac{1}{2}$ inches in diameter at the level of the hole. The nest cavity in the oak was 20 inches from top to bottom with a diameter of $8\frac{1}{4}$ inches at the egg level. The entrance hole went in 3 inches before it turned abruptly downward; the tree at this point was 22 inches in diameter. There was a stub just above the hole in the maple about 4 inches long representing a branch that had apparently died and been broken off years before and started to heal over. The oak was perfectly smooth at the entrance hole, but on either side, slightly above, were the bases of two large branches that could not have given the opening any protection from the weather. The opening in the maple faced north, two of those in the oaks east, and one west. Audubon states: "The birds pay great regard to the particular situation of the tree and the inclination of the trunk; first, because they prefer retirement, and, again, because they are anxious to secure the aperture against the access of water during beating rains. To prevent such a calamity the hole is generally dug immediately under the juncture of a large branch with the trunk." None of the nests examined by us showed this desire for protection from rain, and the chips at the bottom of the cavity were perfectly dry, though we had had some very heavy rains shortly before they were examined.

Audubon (1856) further states: "The average diameter of the different

ests which I examined was about 7 inches within, although the entrance, which is perfectly round, is only just large enough to admit the bird." Beyer (1900) says, "The entrance measures exactly $4\frac{1}{2}$ inches in height and $3\frac{7}{8}$ inches in width," and McIlhenny (Bendire, 1895) gives the measurements of a typical hole as "oval and measures $4\frac{1}{8}$ by $5\frac{3}{4}$ inches," and Scott (1888) as " $3\frac{1}{2}$ inches wide and $4\frac{1}{2}$ inches high." The corresponding measurements of the nests of Pileated Woodpeckers are given by Bendire (1895) as follows: "The entrance measures from 3 to $3\frac{1}{2}$ inches in diameter, and it often goes 5 inches straight into the trunk before it is worked downward." The additional one to two inches in diameter of the nest hole should be kept in mind when searching for reasons why the Ivorybill has proven less successful than the Pileated Woodpecker in its struggle for existence. Thompson (1885) states: "The depth of the hole varies from three to seven feet, as a rule, but I found one that was nearly nine feet deep and another that was less than two." He also claims that they are always jug-shaped at the lower end.

NEST-BUILDING AND INCUBATION

According to McIlhenny (Bendire, 1895) the female does all the work of excavation, requiring from eight to fourteen days, while the male sits around and chips the bark from neighboring trees. Audubon (1856), however, states that "both birds work most assiduously at this excavation, one waiting outside to encourage the other." Maurice Thompson (1896) likewise reports that both birds work at the excavation. We had no opportunity to check either statement but certainly both birds take part in incubation and feeding the young. The chips are not removed from the vicinity of the nest for each one that we have examined has had piles of chips directly below the opening though, since most of the trees were standing in water, the chips were not very conspicuous.

We camped within three hundred feet of our first Ivorybill nest in Louisiana, in 1935. A pair of 24-power binoculars set on a tripod was trained on the nest-opening, and from daylight, April 10, until 11 a.m., April 14, continuous observations during the hours of daylight were made either by the writers or by James Tanner. The nest had been found the morning of April 6, when the female was incubating, but how far along incubation had proceeded we made no effort to determine for fear of disturbing the birds. Contrary to most published accounts, however, the birds were not particularly wary and soon became so accustomed to our presence that they would enter the nest-hole with one of us standing at the base of the tree and later even when one of us was descending from a blind which we built on April 9 in the top of an adjacent rock elm, twenty feet distant from the nest. On April 9, we located a second pair of Ivorybills in the vicinity of a fresh

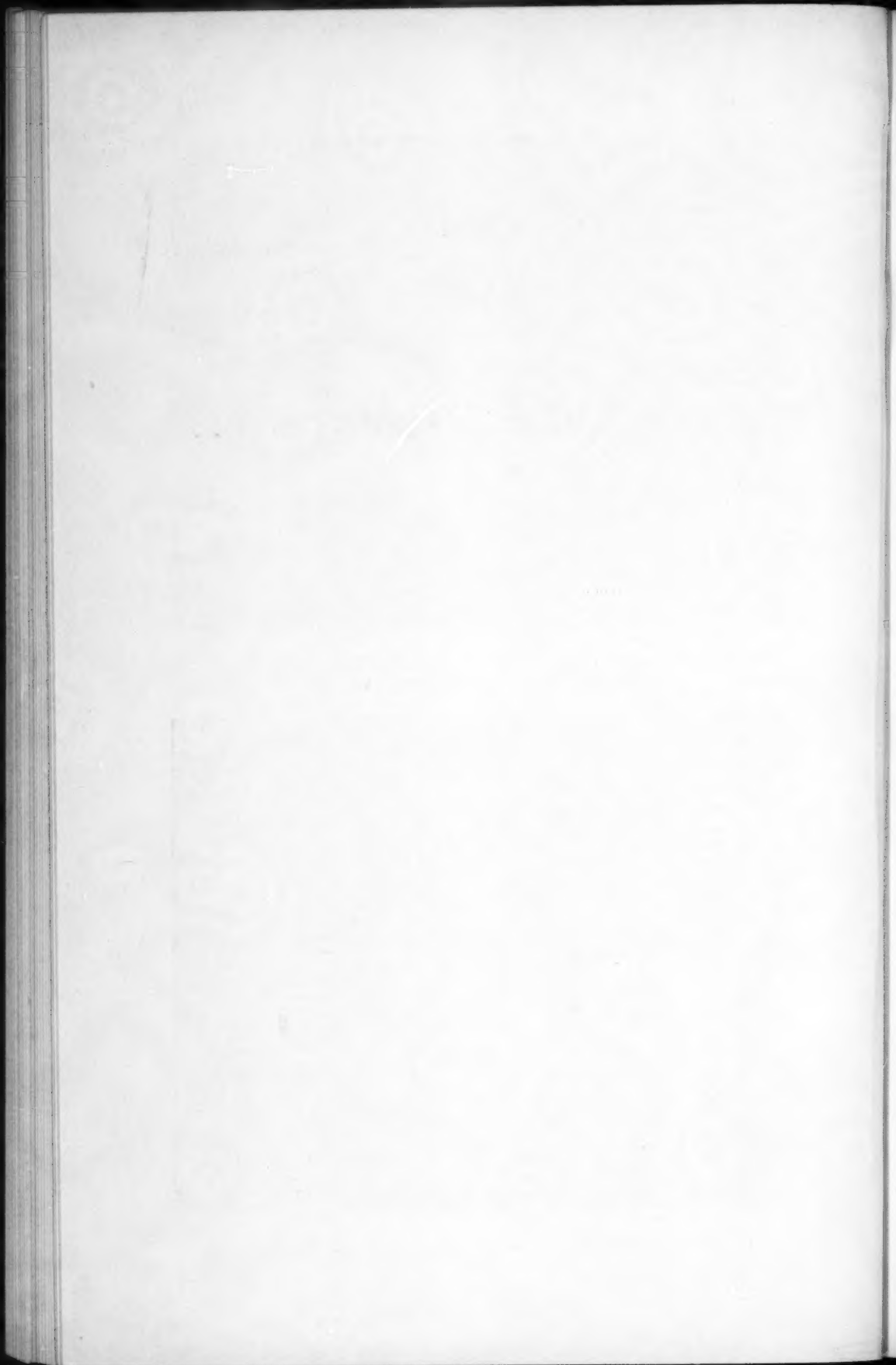


FLORIDA FEEDING GROUNDS OF THE IVORYBILL. THE MALE BIRD (ENCIRCLED) CAN BE SEEN BUT THE FEMALE WAS ON THE GROUND WHEN THE PHOTOGRAPH WAS TAKEN



DEAD YOUNG PINES SCALED OF THEIR BARK BY AN IVORYBILL





hole about fifty feet up in a dead oak, some two miles to the south of the nest in the maple. The following morning, however, the nest was occupied by a black squirrel and the birds had disappeared.

Briefly summarizing our five-day vigil at the occupied nest, we learned that the birds took turns sitting on the eggs, working in approximately two-hour shifts when not alarmed, but changing places more frequently when disturbed. Activities usually commenced about six o'clock in the morning, three-quarters of an hour after Cardinals and Carolina Wrens started singing. At this time the female relieved the male after his having spent the night on the eggs. Activities ceased about four o'clock in the afternoon when the male relieved the female on the eggs and went in the nest for the night. This was nearly three hours before dark, which came about seven o'clock.

Because of the rarity of the species and the lack of detailed observations by previous observers, it seems wise to publish the complete journal of activities for the four days that we kept the record from daylight until dark. At times irregularities in behavior may have occurred owing to our disturbance either in adjusting the microphone and sound reflector near the nest-tree or in getting into the blind in the adjacent tree. The birds paid relatively little attention to us, however, and of course we used the utmost care to reduce any disturbance to a minimum. As with other birds, once the blind and the sound mirror had been accepted, their continuous presence apparently disturbed the birds in no way, and activities went on in an apparently normal manner. Copying, then, from our journal the combined observations of the three of us:

April 9, 1935.—We pitched camp about three hundred feet from the nest discovered on April 6, recorded some of the Ivorybill notes, built a blind in a tree about twenty feet from the nest, and about 4 p.m. watched the male take his place for the night.

April 10, 1935.—6.05 a.m. A few conversational clucks heard at the nest.

7.20 a.m. More conversational notes and a few *kents* heard. (Apparently without our realizing just what had happened, the birds changed places on the nest. A screen of leaves, which was later removed, obscured our vision from the camp at this time.)

8.20 a.m. The female looked out of the hole. No sound.

9.45 a.m. The male came into the vicinity and the female put her head out and answered. Her voice was weaker and less harsh. It began to rain hard and we had to cover the 'mike.' This alarmed the birds. The female left and both called. As soon as Jim got back to the tent the male entered the nest with a couple of *yips* and then all was quiet. It was now raining hard.

11.45 a.m. Some heavy chopping near the tent caused the male to look out. No sound, however, and he soon withdrew into the hole.

12.10 p.m. The male was apparently getting nervous. He came out, gave a few *yips*, and then went back in again.

12.35 p.m. The male flew from the nest when we chopped a small tree which obscured the view of the hole from the camp.

12.37 p.m. The female returned and went on the eggs with Kellogg and Kuhn standing near by.

1.05 p.m. The male returned and called several times. The female appeared at the entrance and pecked at the entrance hole, but did not call. He continued to call a dozen times—she flipped out, caught herself for an instant outside and then flew away after he had alighted at one side of the hole. He then entered to take his place on the eggs. It continued to shower.

1.25 p.m. The female called fifteen times (voice weaker), came to hole, looked in; then the male appeared at the hole, pecked lightly at the edge or rubbed his bill, then left and she entered. He made no sound as he left.

1.40 p.m. Male called three times. After a few minutes the female put her head out and pecked at entrance. Male came to the tree. A wren came down the tree to just above the hole when female looked out and the wren flew away. The male came backing down to within two feet above the nest but then flew away. She gave him a parting look and retired.

2.07 p.m. Female put her head out of entrance and looked down.

2.46 p.m. Female put her head out and looked around. Did not peck or call. Two minutes later came out and went up the right fork about ten feet. Gave one double-hammer note; appeared to be looking for food; opened bill wide and swallowed with some difficulty, then backed down tree and disappeared in nest. All this time a squirrel was scolding.

3.15 p.m. Female looked out but no sound was heard from the male or from her. She came out and turned around, climbed around behind the fork, came back, looked in and around several times and then went in.

3.23 p.m. Male called 17 times, flew to tree in front of nest, rested for a few minutes, flew to hole. A little conversation ensued, sounding like the twitter of a nuthatch. She left and he entered. After a few moments she gave a repeated note twice, *yip-yip, yip-yip!*, but more nasal. She then flew to a big oak about fifty feet from the tent and started scaling the bark from a dead branch, giving her *yip-yip-yip* several times. I (senior author) was able to get directly under her and catch one of the last bits she scaled off, then she flew southward, calling several times with her single note, but more prolonged and less sharp, repeating two to four times.

3.45 p.m. Female called her ordinary note one hundred yards to the east of nest twenty to thirty times.

4.00 p.m. Female heard calling to the west a few *kents*.

4.03 p.m. Male looked out of nest for a second or two.

4.50 p.m. Male looked out when I called *kent!* loudly.

6.05 p.m. Paul Kellogg chopped a log and the male looked out twice, then went back. Next he (Paul) walked up to the tree to look at the 'mike' and the camera and the male looked out and watched him for a couple of minutes. No sign of female since four o'clock, and no more activities at the nest before dark at 7.00 p.m.

April 11, 1935.—Cardinals and wrens began singing about 5.10 this morning and by 5.30 all the birds were singing. The sky is overcast, no wind.

5.50 a.m. The male had his head in the entrance, looking all around; backed down occasionally but came right back again until

6.00 a.m. when he left the nest for a tree one hundred feet to the northeast with a half dozen *kents!*

6.03 a.m. The conversational notes of the two birds were heard near the nest and the female flew to the tree ten feet below the hole, the male to the top of the tree. She climbed and entered and the male flew away to the southwest.



A DEAD GUM WITH ITS BARK SCALED OFF BY IVORYBILLS IN LOUISIANA



ENGRAVER-BEETLE TUNNELS EXPOSED BY THE BIRDS





6.30 a.m. After recording the song of a Prothonotary Warbler, we frightened the Ivorybill from the nest to secure some more voice recordings in the quiet morning period. She did not fly back and made no sound until after a few minutes she came back to the nest and called. A few minutes later the male appeared and called loudly. She flew toward him. A little conversation ensued, the male started calling *kent!* loudly and deliberately; the female *yip-yip-yipped!* more rapidly. The male came to the nest and would have gone in but I (senior author) waved my hand. Both birds seemed tame. They got together on a nearby tree but made no sound or display like Flickers. I retired and the female immediately took her place on the eggs.

8.45 a.m. Tanner went up to the blind, fixed it and pulled up the camera. The female once flew to the nest hole but became alarmed and flew away after climbing to the top of the stub. While T. was setting his camera, the male came and entered the nest. The senior author frightened the male from the nest by rubbing the tree. In about twenty minutes it returned, climbed to the hole, looked around and looked in, but after about half a minute or more it became alarmed by the rattle of the camera and flew off. Ten or fifteen minutes later it returned and acted as before, but finally entered the hole.

About 10.15 a.m. Tanner lowered the motion-picture camera and returned to the blind with a still camera. The male returned and entered the hole before he had a chance to open the shutter. In about half an hour Kellogg approached the tree, the male stuck his bill from the hole and in a few seconds flew away only to return a few minutes later. Tanner took several pictures, moving inside the blind and reaching in front to cock the shutter; the bird moved and looked around nervously, calling some, but finally entered the nest.

About 11.30 a.m. The female flew to the tree and backed down to the hole, then looked in. The male stuck his head out and then flew directly away. The female started to enter but took fright at something in the blind and paused. The shutter clicked, she edged away and then flew. A little later she flew to the hole but again flew away.

About 12.50 p.m. Tanner came down and Kellogg went up the tree. The female once came to the nest-hole but climbed up and flew off. The male came but did not enter immediately.

1.00 p.m. Male entered nest.

1.15 p.m. The female called from a big tree southeast of nest, then flew to place above nest. She called and rapped, backed down to the hole and looked in. The male stuck out his head. The female started, probably at the shutter, and soon flew off. The male peered from the nest for a moment, eyes blinking nervously, then withdrew.

1.30-1.45 p.m. The female *kented* occasionally from trees near the nest. Male inactive.

1.55 p.m. The female landed below the nest, called and climbed up. The male stuck his head out, slipped out. There was a little conversation and then the male climbed way up and flew off. The female started to enter, was startled, hesitated a few moments, then left.

1.57 p.m. The female flew to the nest-hole, called some, started to enter, then left. A minute later she was calling a rapid *ki-ent, ki-ent, ki-ent!* from a tree to the west. She then disappeared.

2.08 p.m. The male called from near the top of the stub, backed down with an occasional *kent!*, then, not hesitating, entered the nest. The female *kented* from nearby.

2.30 p.m. The female landed below the hole, called and rapped, then climbed up to hole. The male stuck out his head and flew straight away. The female started in, hesitated, and then sidled away. She made two more false starts and then went in.

2.35 p.m. She must have left in a moment for by 2.45 she climbed up a small tree north of the nest, then flew west and called both a rapid *ki-ent*, *ki-ent!* and a slow *kent!*

2.38 p.m. The female flew to a big tree south of the nest, called, then flew to nest. She looked in a few times, then entered.

3.00 p.m. The male entered the nest after giving a few calls. The female had just left.

3.15 p.m. The female called, then flew to the tree. The male came out and flew away. The female started in, then turned, and followed the male to a tree north of the nest. A moment later she returned and entered the nest.

3.20 p.m. The female came from the hole, called a few times, then re-entered.

3.40 p.m. The female came from the hole, then re-entered without calling.

3.45 p.m. The female stuck her head from the hole, then flew thirty feet to a tree. She called some, then in a minute flew back to the nest and entered the hole.

4.00 p.m. The female came out and went back without calling.

4.10 p.m. The female stuck her head from the hole but soon withdrew it.

4.30 p.m. The male *kented* from nearby. The female stuck out her head and answered. The male flew nearer and then away. The female called and then flew out of the hole. She gave a few rapid taps on the edge of the hole, climbed up a bit, gave a solid rap, then climbed higher. The male pounded irregularly on a nearby stub.

4.35 p.m. The female returned into the hole silently.

4.45 p.m. The male alighted beside the hole and *kented*. The female projected her head and a talk followed. She stepped out and climbed up the stub, then flew. The male yapped a few times, jumped as the camera shutter clicked and then entered the hole. The female *kented* repeatedly south of the nest.

5.00 p.m. Kellogg started the camera down and the male flew from the nest. He was halfway down when the male returned and entered the nest. The female came to a sapling nearby and *kented*. She called for several minutes and then came to the nest-tree and the male came out. The female, disturbed by Kellogg's motions, flew off. The male circled around the tree and re-entered the hole.

5.30 p.m. The female called and the male came out for a minute and then re-entered the hole. The female flew and then scolded several hundred times.

(Judging from later actions, the birds were somewhat disturbed by our close proximity on this day and called and changed places on the nest more frequently than normal.) *

April 12, 1935.—7.15 a.m. No sounds so far. Went up and tapped on the tree and the male stuck his head out and then withdrew. The female had not yet appeared. Broke the tripod in adjusting the 'mike' and went for a screw. When I returned the female was in the tree twenty feet above the 'mike.' She *yipped* once and the male stuck his head out and called softly, then left the nest. The female entered as soon as I withdrew at 7.30.

9.00 a.m. The female left for a few minutes, gave a few *kents* and then went back again.

9.30 a.m. The male returned, gave only a few *kents* and exchanged places.

9.50 a.m. The female returned with a few *kents* and exchanged places.

12.15 p.m. The male returned, *kented* a dozen times, came to the top of the tree

and backed down. The female stuck her head out, held still, and then drew back. The male came to the hole and the female came out, was quiet for a moment and then flew away and the male took his place. The female *yipped* around in the vicinity for a few minutes.

12.35 p.m. The female returned without a sound and the male left when she came. She took her place and he flew off with no sound uttered. He flew to a tree about fifty feet toward our tent where we got a splendid view of him through our glasses (24×) for twenty-five minutes. He moved only a few feet and spent the entire time scratching and adjusting his feathers, yawning and stretching. He acted as though he were lousy.

1.00 p.m. The male flew to the tree with no sound. The female left with no sound but called a few times several minutes later.

4.15 p.m. The female relieved the male after a little conversation. Then the male climbed the stub and flew away.

5.45 p.m. The male called a couple of times. The female stuck her head out but he did not come immediately and she retired. After a few minutes she came out and climbed up the tree and he flew down to her, exchanging a few weak *yip-yip-yips*. She then left and the male took his place for the night.

April 13, 1935.—5.35 a.m. The male left and the female entered with a few *kents* and a few *yips*.

7.25 a.m. Exchange took place again with a few *kents*.

8.00 a.m. Allen climbed into the tree blind and Kellogg scared the bird from the nest. Birds somewhat disturbed and changed places every fifteen to twenty minutes. Whenever the female returned the male rapped on the inside of the nest before showing his head.

10.50 a.m. Allen lowered the cameras, dismantled the blind and descended the tree, having exposed two hundred feet of motion-picture film and taken twelve stills of the birds.

11.00 a.m. The female came to relieve the male.

12.40 p.m. Exchange.

1.55 p.m. The female went on the nest. The only noise was *yan-yan-yan!*

2.30 p.m. A Red-bellied Woodpecker climbed up past the nest and the female stuck her head out.

5.00 p.m. The male returned. A couple of *kents* and a little conversation and they exchanged places.

At 1.40 p.m. the senior author left camp, going west, and found the female chopping in a dead tree, much like a Pileated, though the gouge she was working on was more irregular. After a few minutes, she flew to another tree and then directly toward the nest. Five minutes later the male was on the same tree chopping at the same hole. He continued thus for twenty minutes before moving on. "I then followed him for an hour, until 3.00 p.m., when he made a longer flight westward and was lost. Sometimes he fed high, sometimes within fifteen feet of the ground, and he was not very wild as I often got within forty or fifty feet of him. His flight was much more direct than a Pileated's—usually sloping downward with a final swoop upward as he landed. Sometimes he chopped for ten or fifteen minutes on one tree, sometimes only two or three. Sometimes he merely

chopped off the bark, but nearly as often he went to old cuttings and enlarged them for whatever was inside—perhaps carpenter ants or termites. Some of the chips he knocked out were two inches long and an inch wide, but mostly smaller. His *knitting* varied a great deal, perhaps depending on whether he noticed me. Most of the time he was silent. His tail was always closed and pointed in flight, his head and bill straight out; his wings looked much more pointed than a Pileated's, and narrower, but this might be an illusion on account of the large amount of white."

April 14, 1936.—While we were getting ready to break camp, Tanner brought Professor Roberts and Mr. Lowery of Louisiana State College from our base camp to see the Ivorybills, and the birds continued to behave normally even under the scrutiny of these additional pairs of eyes.

At noon our driver returned for the wagon with four mules, and since there seemed little further to be learned at this stage of the Ivorybill reproductive cycle, we broke camp, planning to return in two or three weeks when the eggs should have hatched and the parents would be engaged in feeding the young. Mr. Kuhn offered to visit the nest from time to time and report to us as to its progress so far as he could tell from the actions of the birds. Accordingly, we traveled south to Avery Island and thence west to Oklahoma to make studies of the Lesser Prairie Chicken, and did not get back to Louisiana until May 5. During our absence Mr. Kuhn had found another Ivorybill's nest about a mile to the northwest of our first nest and had heard of another pair of birds about seven miles south. He had visited our nest in the maple on April 29 and had found the birds behaving rather strangely. The male came flying toward him as he approached but soon paid no attention to him; then the two birds took turns looking into the hole, remaining inside for a few minutes and then flying to another tree about fifty feet away and there spending a great deal of time preening themselves, but they were apparently not feeding any young.

On May 9, the senior author visited the nest with Mr. Kuhn and Dr. L. M. Dickerson, who was on a tour of inspection for the National Park Service, and found it deserted and the birds nowhere to be seen or heard. We spent most of the day waiting for these birds and hunting for the nest which Kuhn had found on April 29 a mile to the northwest, but since he had not marked it and the jungle was so thick and the birds so quiet, we were unable to relocate it. Toward evening we returned to our first nest. Mr. Kuhn and Dr. Dickerson heard the birds about a quarter of a mile to the north, but since the birds did not come any nearer to the nest, about 6 p.m. we cut down the tree, which we were unable to climb, and examined the contents of the nest-cavity, preserving everything in a paper bag. At the time, by the dim light, all we could find in the dry chips at the bottom of the hole were tiny fragments of egg-shells, and no sign of blood or albumen or even



THE IVORYBILLS EXCHANGING PLACES ON THE NEST



THE IVORYBILLS' NEST IN THE SWAMP MAPLE AT THE RIGHT AND OUR OBSERVATION
BLIND IN THE TREE AT THE LEFT



moisture. The next morning, however, under a desk lamp at the hotel, as the heat of the lamp warmed up the 'sawdust,' the material gradually came to life and swarmed with innumerable tiny mites and we soon felt them crawling all over our hands. We quickly bagged the entire contents again, trying to return as many of the creatures from our hands as possible. The bag was mailed to Professor C. R. Crosby at Cornell University; he referred the material to a mite specialist, Dr. Arthur Jacot, who has given us the following report:

Appalachian Forest Experiment Station
Asheville, N. C.
August 23, 1935

Dear Dr. Allen:

The mites from the sawdust of the Ivorybill nest-cavity are now mounted up and I determine them as follows:

- | | |
|-----------------------------------|-----------------------------------|
| Oribatidae | |
| 1 = <i>Galumna curvum</i> (Ewing) | } Eaters of wood, fungi and algae |
| 1 = <i>Carabodes</i> | |
| 1 = <i>Platynothrus</i> | |
| 1 = <i>Suctobelba</i> | |
| Predaceous | |
| 1 = <i>Cheyletus</i> | |
| 1 = Uropodid | |
| 1 = Gamasid | |
| Parasitic? | |
| 3 = Of the group Anachotricha | |
| Family? | |

As already stated, this is but a meager sample of what must have been in the sawdust but I got it too much dried out to secure the rest of the fauna.

Yours sincerely,
(signed) ARTHUR JACOT

When the mites began crawling on our hands that morning in the hotel, we were reminded of the actions of the birds at the nest and how nervous they sometimes seemed after incubating for a short time and of how much time they sometimes spent preening when they came out of the hole in the maple. Knowing from experience of mites having killed young House Wrens, Redstarts, Louisiana Water-Thrushes, Phoebes and other birds, we wondered if they could not have been responsible for the destruction of the young Ivory-bills, either by killing the young outright or by causing so much nervousness on the part of the parents that the eggs failed to hatch or the young to be properly brooded. The small fragments of egg-shells left in the nest favor the belief that the young hatched as the shell fragments were about the size that one normally finds in a woodpecker's nest after the larger pieces have been carried away by the parent birds. What became of the dead young remains a mystery, though with some birds it is a common practice to remove dead young from the nest if they die during the period

that they are being brooded. We have known Flickers to leave one or more dead young in the bottom of the hole while they continued to feed the others, but in such cases the young were so large that they were no longer being brooded and the parents doubtless did not know what had occurred. Without knowing definitely what actually happened to this nest, we are probably safe in concluding that the eggs hatched and the young disappeared from some natural cause when they were small and probably less than a week old.

The following day we rode southward through the woods seven miles to the area from which the fourth pair of Ivorybills had been reported. We arrived just in time to catch the distant exchange of calls when the birds exchanged places at the nest, and, while the senior author marked the general direction, Kuhn advanced and soon his sharp eye marked the male bird near a hole 47 feet up in a dead pin oak which stood at the edge of a small, more or less natural clearing. Here the visibility was very good, and it was not difficult to conceal oneself in the luxuriant tangle of poison ivy and cat briars that covered the lower vegetation. The female was inside, brooding, but did not come out when we pounded on the tree. A little later, however, when Kuhn had gone after Dickerson, and the senior author was moving to get a better point of observation, the female put her head out, discovered him, left the nest and started calling in characteristic manner. Almost immediately the male appeared and added his notes to the commotion. About this time Kuhn and Dickerson returned, and the birds transferred their attention to them. Very shortly, however, they forgot us and went about their normal activities, which we proceeded to record for the next hour and a half as follows, watching the birds through 24-power binoculars:—

May 10, 1935.—10.46 a.m. The female entered the hole with her bill slightly open.

10.53 a.m. The female looked out with bill open as though she were hot. She came out and climbed the stub with bill agape. The male came to the snag, calling as he hit it, and stood at the entrance calling for some time and after making several starts entered the hole at 10.56, but immediately put his bill out and soon came all the way out, when the tip of his bill looked wet. He called upon leaving as though perhaps he saw one of us batting mosquitoes or raising the glasses. He then sat on the dead stub between us and the nest, interspersing *kents*, with double whacks of his bill.

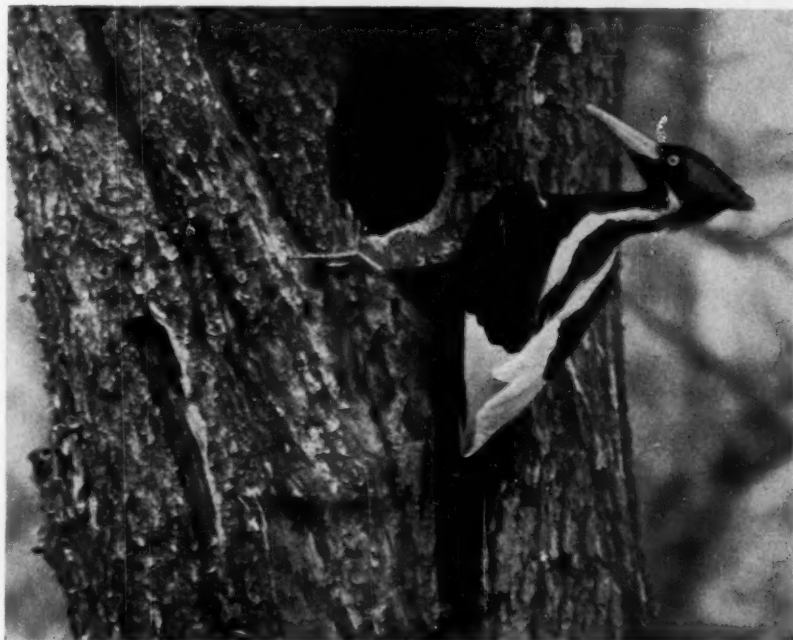
11.10 a.m. The female returned and entered the hole with bill agape, leaving almost immediately. The male, about fifteen feet away, continued to scold.

11.16 a.m. The female returned with bill agape. Was in the nest about thirty seconds. Her bill seemed moist when leaving. The tip was discolored,—brownish,—as was also the male's, either from the dead wood or berries.

11.36 a.m. The female returned slightly below the nest, climbed to it and entered. Her bill was not agape this time but the tip was discolored.

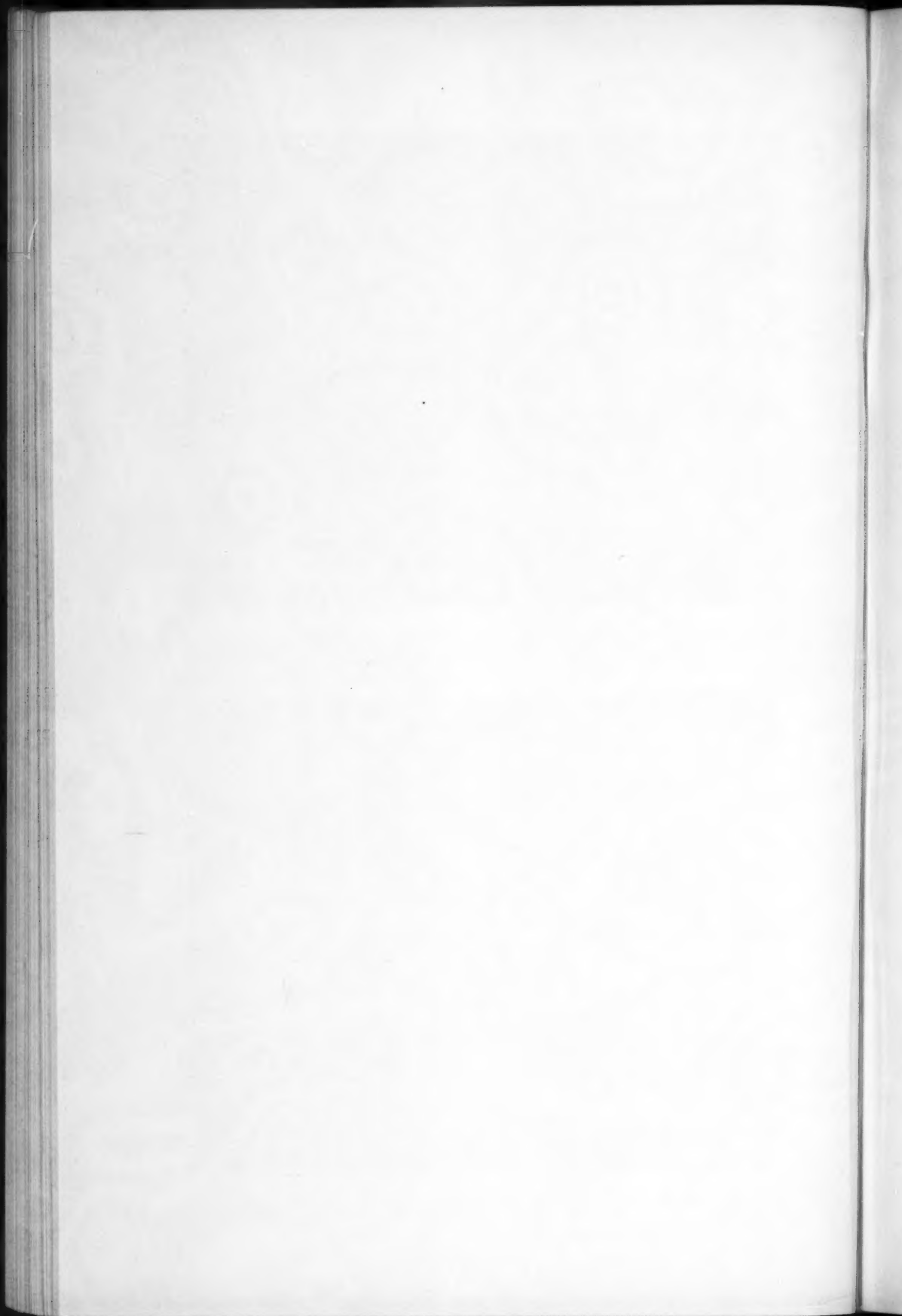


THE FEMALE IVORYBILL RETURNS TO THE NEST 43 FEET FROM THE GROUND; THE TREE IS $18\frac{1}{2}$ INCHES IN DIAMETER AT THIS POINT



THE MALE AT THE NEST ENTRANCE WHICH MEASURES $4\frac{1}{8}$ BY 5 INCHES





11.39 a.m. The female put her head out and held her bill open as though hot. She put her head in and out several times but finally got down out of sight until

11.40 a.m., she came out and climbed the snag with bill open and preened near the top. The male had stopped calling but could be heard two hundred feet away digging.

11.42 a.m. The male called three times and the female answered with *yip-yip-yip!* and soon flew toward him when he called *ken!* several times, but kept on digging.

11.52 a.m. The male flew to the nest but did not enter. Called, looked in, and then flew toward us and called some more continuously. When he alighted his bill was agape and I could see him protrude his tongue. He apparently considered himself guardian.

11.55 a.m. The male ceased calling and apparently left for food.

12.00 m. I walked toward the nest and remained about forty feet from the tree behind a gum.

12.05 p.m. The male returned with a big borer grub held lengthwise in his bill. He did not come to the nest immediately, however.

12.10 p.m. The female came and fed.

12.12 p.m. The male came and entered with his grub. He remained inside a couple of minutes and I could hear a weak buzzing from the young. Apparently they were too small to swallow the grub for he left with it to a tree one hundred feet away and apparently swallowed it himself.

When we left at 12.30 p.m., the birds had apparently accepted us and paid no attention to our going. We returned to our base camp intending to move down to the vicinity of this nest so as to make more conveniently, continuous observations on the care of the young. They were obviously very young, and so we delayed our return until May 14, when, to our dismay, we discovered that this nest also had been rifled. When we were thoroughly satisfied that the birds were nowhere around we secured a crosscut saw and an axe and cut the tree down. Since it was fairly solid at the base and about ten feet in circumference, this was 'quite a job.' Once again the only evidence of the hole having been occupied by woodpeckers was the tiny fragments of shell similar to those in the swamp-maple nest. There was no sign of young birds having been in the nest, nor was there any evidence of blood or of spilled food or excreta, and in this nest there were no signs of mites. The young birds had just mysteriously disappeared, and the old birds had deserted the area, though Kuhn thought he heard them half a mile to the north when we were leaving.

The unfortunate history of these two nests which we had hoped to study was exactly paralleled by that of a third nest which Kuhn had discovered on May 13, 1933, forty-five feet up in a black oak. The nest was located within one hundred yards of the nest just described. Kuhn visited the nest on May 16 and again on May 23 and May 27. Activities about the nest seemed to him normal except that the birds were rather wild (more so than the pairs we have been describing), and during the three hours he watched them, they changed places on the nest every eleven to twenty

minutes, indicating that they were probably feeding young. He sent a telegram to Dr. T. Gilbert Pearson, President of the National Association of Audubon Societies, and Dr. Frank Oastler came down on June 7 to verify the discovery and secure some motion pictures. When he and Kuhn arrived at the nest-tree, however, they found it deserted, and Kuhn was very disconsolate for having brought Dr. Oastler so far on a 'wild-goose chase.' Having determined that the birds had in truth deserted the tree, they cut it down and, just as in both of our nests, the only evidence of its ever having been occupied by Ivorybills or any other birds was the tiny fragments of egg-shells.

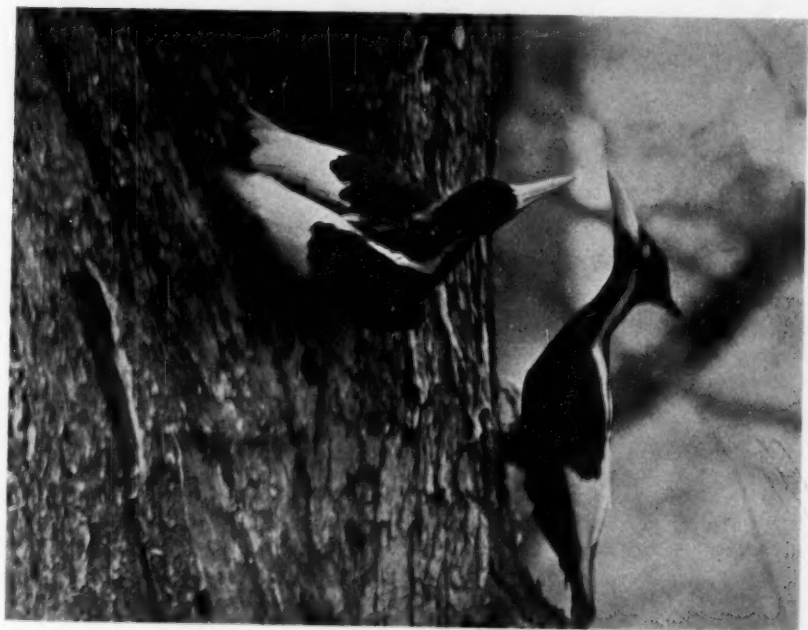
The histories of these three nests, therefore, were almost identical, with the Ivorybills managing to hatch their eggs successfully but losing their young for some cause during their early life. At this time it is appropriate to call attention to the fact that in the literature there are relatively few references to young Ivorybills and there is no complete description of an immature bird, that of Scott (1888) being the only one we have found.¹ Even Ridgway (1914), in his 'Birds of North and Middle America,' omits the juvenal plumage from his consideration, describing only the adult male and female. Scott (1888) and Beyer (1900) both speak of nests with only one young, and in the type set of eggs from the Ralph Collection, two were infertile and only one contained an embryo. Our guide, J. J. Kuhn, in all his experience with Ivorybills, had seen young, to recognize them as such, only twice. He described them as resembling the female, but not so black, and with apparently more white in the plumage.

With these facts in mind it seems safe to conclude that a critical period in the life of an Ivory-billed Woodpecker is during the early life of the young. Whether this is due to predators or to innate weakness in the stock has not, of course, been determined, and there are arguments to be advanced on both sides. If predators are important, we would have to explain an apparent discrimination in favor of the Pileated Woodpeckers which nest practically side by side with the Ivorybills but which are apparently much more successful in rearing young. In this connection there is apparently one real difference in the nesting of the two species: the size of the nest hole, which is over an inch greater in diameter in the case of the Ivorybill. This might admit certain enemies such as raccoons, opossums, and Horned and Barred Owls that cannot enter the smaller hole of the Pileated Woodpeckers. On the other hand, we found no signs of conflict in the nest-cavities which we examined that might indicate that some marauder had entered. The second nest which we discovered was occupied the next morning by a black

¹ "The young bird in the nest was a female, and though one-third grown had not yet opened its eyes. The feathers of the first plumage were apparently beginning to cover the down, and were the same in coloration as those of the adult female bird."



THE MALE IVORYBILL RETURNS TO RELIEVE THE FEMALE



THE MALE IVORYBILL LEAVES AS THE FEMALE ARRIVES





squirrel but at this date (April 9) there could not have been young in the nest, and we have no way of knowing that there were even eggs.

The mites may well have caused the destruction of one of our nests, but the two others showed no indication of nest parasites, and many young birds of other species manage to survive even when heavily infested with mites. This leaves us with the theory of inherent weakness due to inbreeding, and that of lack of synchronization in the reproductive cycles due to the birds' scarcity and resulting lack of choice in selecting mates. Inbreeding in other birds and animals frequently results in a high infant mortality; lack of 'sex rhythm' (Allen, 1934), in infertile eggs.

Even at a time when the birds were apparently numerous, 'inbreeding' might have become of importance owing to the sedentary nature of the birds; and with the increasing isolation of these family groups from others of their kind through the activities of man (including the primeval Indians), any weakness of the stock may have become still further emphasized and resulted in still greater infant mortality. The destruction of Ivorybills by the Indians in the early days is mentioned even by Catesby, in 1731. In his original description of the bird, "*Picus maximus rostro albo*," he says, "The bills of these Birds are much valued by the *Canada Indians*, who made coronets of 'em for their Princes and Great Warriors by fixing them round a wreath with the points outward. The *Northern Indians*, having none of these Birds in their cold country, purchase them of the *Southern People* at the price of two, and sometimes three, Buckskins a Bill." Thus early did commercialization of the Ivorybill start, and the price on its head has continued to the present day. Indeed, the publicity which a certain group of Ivorybills received a few years ago by the local press in which the statement appeared that they were worth a thousand dollars apiece, caused the death of one bird (and possibly others) at the hands of an impressionable youth who hoped to find a market for his specimens. But this commercialization, we believe, has been only an indirect cause of the near extinction of the bird, and while we should do everything humanly possible to give the present stock complete protection from man, we should likewise bend our efforts toward a more nearly complete study of the living birds than has thus far been possible, in an effort to determine definitely whether there is always this high infant mortality and whether inbreeding is the cause.

Difference of sex rhythm is always important when a species is so scarce that the individuals have little or no choice in the selection of mates. It expresses itself usually in the production of infertile eggs rather than in weak young, though weak germs and infant mortality are possible results also. Scarcity of young might be due to either cause. The 'introduction of new blood,' as is sometimes practiced in game coverts, will not necessarily strengthen the present stock unless the new birds happen to be synchronized

with the old. Just what controls the variations in the sex cycles of individual birds living apparently under identical environmental conditions is not always explicable, but the problem becomes increasingly important as the number of individuals involved decreases. The type set of Ivorybill eggs already mentioned, of which two of the three were infertile, might well be an indication of this lack of synchronization. One would expect considerable irregularity in this respect in different Ivorybill communities entirely dependent on whether or not the birds happen to be synchronized.

Before concluding this discussion it might be advisable to mention a few other observations which have no bearing on the disappearance of the birds but in which the observations of the writers vary somewhat from those of previous writers.

VOICE

There seems to be some confusion as to the different notes of this bird and their carrying power. Audubon states: "Its notes are clear, loud, and yet rather plaintive. They are heard at a considerable distance, perhaps half a mile, and resemble the false, high note of a clarinet." This description fits very well the common note of the bird, and anyone can produce the sound very accurately by using only the mouthpiece of a clarinet. It is doubtful, however, if the loudest calls can be heard, under normal conditions, for a quarter of a mile, and some of the weaker ones are scarcely audible at 300 yards. However, when we tested the carrying power of one of our recordings of the common alarm note, *kent*, amplified until it sounded to our ears normal at about one hundred feet, the call was distinctly recognizable at a distance of 2500 feet directly in front of the amplifier with no trees or buildings intervening. At a 45-degree angle the sound was not recognizable at half this distance. The birds are so often quiet for such long periods that we can scarcely agree with Audubon's statement that "the bird spends few minutes of the day without uttering them." They seem much more likely to call when they are alarmed, as when they discover an intruder in their haunts. Both birds give the call, but that of the female is somewhat weaker. In addition to this *kent* note, as it is called by the natives of Louisiana, and because of which they call the birds 'Kents,' they have a variety of low conversational notes when they exchange places at the nest, which are suggestive of similar notes of the Flicker; but they never, so far as we know, give a call at all similar to the *pup-pup-pup!* of the Pileated, nor have we ever heard them sound a real tattoo like other woodpeckers, such as described by Thompson (1885), and which McIlhenny (Bendire, 1895) compares to the "roll of a snare drum." The birds in Florida and all those in Louisiana telegraphed to each other by single or double resounding whacks on the trunk or dead branches. Mr. Kuhn who has had years of experience with them, likewise has never heard any notes

or tatoos that were comparable with those of the Pileated. Our observations agree with Audubon's, rather than with those of some others, in that "it never utters any sound while on the wing."

FLIGHT

Audubon's (1856) description of the flight of the Ivorybill was quite misleading to us: "The flight of this bird is graceful in the extreme, although seldom prolonged to more than a few hundred yards at a time, unless when it has to cross a large river, which it does in deep undulations, opening its wings at first to their full extent and nearly closing them to resemble propelling impulse. The transit from one tree to another, even should the distance be as much as a hundred yards, is performed by a single sweep, and the bird appears as if merely swinging itself from the top of one tree to that of the other, forming an elegantly curved line."

In Florida and again in Louisiana we observed the birds making long as well as short flights, and we were impressed by the similarity of the flight to that of a Red-headed Woodpecker rather than of a Pileated, because of its directness. In going from tree to tree there is usually an upward swing as the bird alights, but this is the nearest to an undulation observed. The tail is kept closed in flight, and owing to the large amount of white in the wings they appear much narrower than the Pileated's. The head is carried straight forward so that the impression given by the bird at a distance is much more that of a duck than of a large woodpecker. In fact, one local hunter told us that he had sometimes been deceived by them even to the extent of shooting at them, thinking that they were ducks. This is not so impossible as it at first seems.

SUMMARY

1. Nesting Ivory-billed Woodpeckers were studied in Florida in 1924 and in Louisiana in 1935.
2. Photographs, motion pictures and records of their calls on film were made in Louisiana.
3. Observations are presented on their sedentary habits, their feeding range, their food, methods of securing it, their calls, their courtship, dates of nesting, choice of nesting sites, measurements of nest-cavities, incubation and feeding of the young, and their nest parasites.
4. A record of all observations made at one nest from daylight until dark for four days during incubation is presented, as well as of similar observations at another nest for an hour and a half during the early life of the young.
5. The unfortunate ending of three nests is described and analyzed in the light of published data on other nests and the following theories (worthy of

further investigation) are offered as plausible explanations for the near extinction of the species: (a) sedentary habits resulting in inbreeding and weak young as soon as the colonies became isolated through commercialization and deforestation; (b) lack of 'sex rhythm' for the same reason, resulting in infertile eggs; (c) predation by such enemies as raccoons, opossums and owls admitted to the nests because of the large size of the openings, whereas the smaller openings of the more successful Pileated Woodpecker's nests prevent such admittance.

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THE STATUS OF MACGILLIVRAY'S SEASIDE SPARROW

BY IVAN R. TOMKINS

THE only recent attempt to treat the Seaside Sparrows as a group, is that of Griscom and Nichols (1920) who in their revision mention that dark, medium, and light forms are found together in South Carolina and Georgia. The present paper deals with one of the most variable of the entire group, Macgillivray's Seaside Sparrow (*Ammodramos maritima macgillivrayi*), with emphasis on the color variations occurring within the breeding range as given in the current Check-list,—North Carolina to northern Florida. The paper also touches briefly on the Northern Seaside Sparrow (*A. m. maritima*).

Since the publication of Griscom and Nichols' revision, Oberholser (1931) has described a pale bird (*Thryospiza m. waynei*) from Chatham County, Georgia, re-affirmed the status of *macgillivrayi* as a dark bird breeding from North Carolina to the South Edisto River, South Carolina, and described another dark bird (*T. m. pelonota*),—type locality New Smyrna, Florida—as slightly different in size and proportion from *macgillivrayi*. Bailey (1931) described a new subspecies (*T. m. shannoni*), from Duval County, Florida. This supposed race appears synonymous with *pelonota*, and reference is made only to indicate that it has not been overlooked.

At first, it seemed unlikely that both dark and light forms were breeding together, unless two distinct species were present breeding contiguously but not mixing. The presence of intermediates, however, would make this theory untenable. It seemed that late migrants or non-breeders might have confused the matter if taken along with breeding birds. Now, however, the evidence proves quite conclusively that dark, light, and intermediate birds breed together in two distinct areas, one in North Carolina and the other in northeastern Florida. In the intervening area, Georgia and South Carolina (at least as far north as Charleston), only the light form breeds. This form appears to be identical with the light birds, occurring among the dark, in North Carolina and northeastern Florida. Furthermore, when in fresh fall plumage, the race breeding in Georgia and southern South Carolina is oftentimes indistinguishable in color and size from fresh Connecticut birds.

In reaching this conclusion use has been made of skins from North and South Carolina, loaned to the Charleston Museum by the U. S. National Museum; the Wayne journals and collection (mostly migrants and winter birds), as well as the series of local birds in the Charleston Museum; Dr. Louis B. Bishop's series of birds from the four States involved, and a few

Connecticut birds; and my own sixty-odd skins collected at all times of year, during the last seven years, in Georgia and southern South Carolina.

The migration of the species has not been well worked out, due to obvious difficulties, and in view of the close resemblance between certain winter *waynei* and *maritima*, some of the winter records of the latter subspecies are probably incorrect. About the only positive long-time migration records in this area come from the Wayne journals, and concern the dark form only. He knew this form under several names from 1890 until his death in 1930; knew them in the field and collected many. He found the earliest autumnal specimen in late July, then two in August, and increasingly through the autumn. He found them throughout the winter and recognized a migration flight from April 17 to 27. But he found none during May, June, and most of July. About the Savannah River mouth, the local birds arrive much earlier. The males appear first in late March, go at once to the breeding grounds, and are in song.

The measurements of the group have been tabulated in various ways, as: dark *vs.* light North Carolina birds; dark *vs.* light Florida birds (from Amelia Island); all the dark against all the light birds south of Virginia, etc., but no satisfactory basis of differentiation has been found in size or proportion. This agrees with the findings of Griscom and Nichols.

The dark form varies considerably in degree, apparently shading completely into the light form, but in the stronger shades can definitely be distinguished, no matter what the state of wear of the plumage. Other writers have inferred that the blackish back feathers wear in the late breeding season to an approximation of the light form, but this proves incorrect. Wayne's July specimen was marked "belly bare" in his journal, indicating worn breeding plumage, yet he recognized it correctly. The Seaside Sparrows have but one complete moult a year, and usually breed in well-worn plumage. The occasional one to be found then in fair feather is probably in that condition because of a delayed postnuptial (or postjuvenile) moult of the fall before.

The blackish center streak to the tail feathers, formerly regarded as diagnostic of *macgillivrayi*, may be found in any of the group, even *maritima*, but the streak is widest and darkest in the dark North Carolina and the dark Florida birds. It is often absent in worn *maritima* and *waynei*.

This anomaly of mixed color variations is hard to construe, as to evolution. It upsets the common belief in a regular geographical progression of races, and makes it impossible to believe that density of cover is much of a determining factor. An analogous situation exists among two other birds of nearly the same habitat, the Long-billed Marsh Wrens (*Telmatodytes palustris*), and the Clapper Rails (*Rallus crepitans*).

The color differences of this group might be explained, genetically, by the

presence of one or more color mutations, normally recessive until a hurricane or other severe cause destroys a considerable portion of the breeding stock, and permits enough inbreeding of the isolated remainder to establish the characters according to Mendelian law. The dark form may or may not have once bridged the several hundred miles between the two parts of the present range. And the recessive genes may be quite widely spread through the group, and have become evident in two different places due to similar cause. Possibly in each place there is a slightly different, though quite similar mutation. Certainly it is found in both sexes. This theory might be expanded to cover the entire group of Seaside Sparrows, and in connection with destruction by hurricane, mentioned before (Tomkins, 1934) explain the seemingly erratic distribution of the variously colored forms of the group. A point in favor of the hurricane factor as applied to the present group of Seasides, is that the species is most stable north of North Carolina (the range of *maritima*), where the tropical storms of summer are less destructive, and is most variable along the more tropical parts of the range.

It is difficult to fit our present system of nomenclature to such a situation. With a definitely graded and fairly constant difference in color or size, it is hard enough to mark a definite point of departure, where the range is continuous. But where, as in this case, there are several color differences shading into each other *in the same territory*, and the added confusion of this happening in two widely separated parts of the range, with the common color forms fairly constant between, the nomenclatural problem becomes almost too complicated.

The type locality of *macgillivrayi* is Charleston, South Carolina, but if Oberholser's *waynei* is a distinguishable race,—which to me seems at least debatable,—and breeds on through the Charleston territory, then the name *macgillivrayi* may belong to that subspecies. There are several possibilities here. First, that Dr. Bachman furnished Audubon with migrant birds from farther north. This is at least plausible when it is considered that the probable type was a young and very dark bird, and not a breeder (Chapman, 1899, p. 10). There is also the possibility that the range of the dark birds has receded in the hundred years intervening between Audubon's time and the present. Equivalent changes have taken place in other species in that length of time, and the damage done by storms has occasionally been considerable.

On the whole, the best course is to retain the arrangement of the present Check-list until later research shall prove more plainly the relationship and range of the forms in question. Briefly, there is no point in making a change in arrangement, when such a doubtful situation exists.

Acknowledgments are due to the U. S. National Museum for the loan of

specimens; to Dr. Louis B. Bishop for the loan of specimens and for much friendly advice; to Mr. Gilbert R. Rossignol, for the loan of correspondence with Wayne and others; and to Mr. E. Burnham Chamberlain and the Charleston Museum for all manner of help.

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A NEST-BUILDING MALE SONG SPARROW

BY WILLIAM E. SCHANTZ

IN early March, 1933, a Song Sparrow (*Melospiza melodia beata*) came to our neighborhood, a rather closely built-up section of northeastern Columbus, Ohio. After a few days he was attracted to a small red cedar twelve feet from our rear window, and here he began a nest. When it was half completed, he ceased building and roosted on it the remainder of the year. Although he sang a great deal, no mate appeared.

During the next spring he built an excellent nest a few inches higher in the same cedar, but still no mate came to use it. In mid-summer he ceased to be about our premises almost all day, but centered his attention about a half square to the north, although he usually returned each evening to bathe and roost. For a few days in late summer he was accompanied to our yard by a mate and two or three young. It was not long before he was again a bachelor, remaining with us throughout the winter.

Very early in the spring of 1935, he began a third nest several inches above the last one. Soon a mate came, and they moved to a neighbor's yard where they both built a nest in a brush-pile. This was hauled away after the eggs had been incubated for two days, whereupon the birds returned to the cedar and completed the first nest. *In it they raised four broods, relining it three times.*

SUMMARY OF FOUR BROODS

First egg	Number laid	Hatched	Young left nest	Number reared
May 1	3	May 14-15	May 27	3
June 1	5	June 14-15	June 26	2
July 2	4	July 16-17	July 25-26	1
August 2	3	August 16-17	August 26	1

One egg of the third brood did not hatch. The female had laid *five* sets of eggs and raised seven young to independence. The nest was in excellent condition after the last brood left it. The male was absent from the time the last brood left the nest until October 20, after which he remained all winter, usually roosting in the cedar.

On April 14, 1936, a new mate appeared and both began a nest seven and a half feet up in the cedar upon the excreta left there by the roosting male. It was not finished until May 3. On May 1, a Cowbird (*Molothrus ater ater*) had visited the unfinished nest, coming again on the 5th, when she laid an egg. After each visit the male spent most of his time perched on the edge of the nest or nearby, singing or preening. Neither rain nor our faces gazing up at him about twenty inches away deterred him from singing

or frightened him away. The four Song Sparrow's eggs hatched as well as the Cowbird's. On May 31, the young Cowbird was monopolizing the food, getting all of it at seven consecutive feedings. We tried to remove it, but its *cheep*-ing and strong, sharp claws clinging to the young Song Sparrows caused them to scatter from the nest.

The little birds were caught and the male tried to lure them away. He brought food close to them and then hurriedly ran a short distance across the lawn. He then looked back and, seeing he was not followed, repeated the performance. Over and over, dozens of times he tried, but in vain, for the young were imprisoned in our hands. I then put them into a tub, whereupon the male rushed at me with open bill and spread tail, making a hissing sound. When newspaper was tied around the tub, the male changed his tactics; he kept circling about and running ahead of me with his wings held stiffly upward.

The female in the meantime had been acting differently. At first she repeatedly carried food to the empty nest; next she skulked about under the shrubbery with food in her bill, but finally she found her way to the young by following her mate. On June 3, the female was trying to get the young out of the tub, but the male merely fed them. Both parents were concerned over the presence of a Blue Jay (*Cyanocitta c. cristata*). The female succeeded in getting two of the young out of the tub, one of which was snatched up by the jay and eaten on a nearby fencepost. The parents were frantic as long as the little bird cried, but appeared to forget the tragedy quickly.

The second brood of 1936 was reared in a neighbor's yard, but for the third the birds returned to our grounds, building in a barberry bush. The three eggs were laid July 10-12, but never hatched, although incubated faithfully for twenty-four days. When opened, they were found to contain half-grown embryos. It may have been that the female had been frightened off her eggs by a cat some night. She disappeared August 5 and was never seen again. The male had disappeared on August 3 and was not seen again until October 11, when he seemed very glad to get back to the cedar. He was around continuously for a month when he dropped out of sight again, possibly never to return.

This last female became antagonistic to her mate after each set of eggs had been laid, remaining so until the young were well feathered. When the male approached, she faced him with open bill and spread tail, giving a growling note. At times she threatened him while he was singing, causing him to cut short his song. If she approached while he was feeding, he retreated four or five feet and did not venture to return until she had finished. When the food was inside the feeding cage, and she came there before he could escape, he fluttered around in a panic. On one occasion when he

paused a moment in his fluttering, she quickly seized him by the neck and both held their heads low and motionless. When she released him, a feather floated away, and he again was too frightened to escape. The male had always been friendly. His mate of 1935 gradually became tame and the same was true of the 1936 bird. As we sat on the rear steps, the birds regularly ate from the step below the one on which our feet rested.

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DISCUSSION BY MARGARET M. NICE

ON May 31, 1936, I had the privilege of seeing Mr. Schantz's pair of Song Sparrows and their nest and later of studying his detailed records. There are several points in the foregoing account to which I would like to call attention.

Striking departures from the behavior of the large number of Song Sparrows which I have studied for eight years in a different part of Columbus were the nest building of the male and the raising of four broods in the same nest. In my experience the male carries nesting material at an early stage of the nesting cycle, but once the real nest is started, takes no further part in building. Lone males of various species sometimes build nests; the bird under discussion not only did this, but later assisted his mates in building. Perhaps his latent (?) nest-building instinct had been developed by practice when mateless in 1933 and 1934.

With my Song Sparrows a later nest was invariably built at some distance from a previous one, although I know of three instances in other localities where a nest was used for two broods in succession. The remarkable fidelity to the one nest in 1935 may have been partly due to the attachment of the male for the cedar, the only evergreen in the vicinity, since he roosted in it much of the time for four years and built in it each year.

Other points of particular interest are the despotic attitude of the 1936 female toward her mate, and the latter's behavior when his young were captive: his attempts to lure them, then to intimidate Mr. Schantz, and finally the 'nest-protecting' display. This last procedure is typical of parent Song Sparrows when young of seven days or older appear to be in danger.

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A COLLECTION OF BIRDS FROM OMILTEME, GUERRERO

BY LUDLOW GRISCOM

IN THE spring of 1936, Mr. W. W. Brown, Jr., returned to the State of Guerrero, Mexico, and with Mrs. Brown succeeded in perfecting arrangements to camp for some time in the high rain forest at Omilteme, a place famous as the type locality of many endemic specialties of the high Sierra Madre del Sur. Work was begun on March 20 and continued through July 8. While Omilteme was 'headquarters' throughout this period, other localities appear on Mr. Brown's labels as follows: Mujileca (April 16 only), Esposcate (April 30 only), Isguagilite (May 13-20), Rincon Caparosa (May 24 only), Jaleaca (June 6 only). Three of these places are hamlets on the mule trail from Chilpancingo to Omilteme. The others must be in the immediate vicinity, as birds were shot at Omilteme on the same day. All are slightly lower in altitude. None is of the slightest real consequence, except Isguagilite, where the fair number of birds collected shows a high percentage of species characteristic of the Tropical Zone with almost no Subtropical-Zone forms.

The collection contains 490 specimens, belonging to 107 species, and is consequently very critically selected. With very few exceptions, the only species in series are the specially desirable birds of higher altitudes, all of which were breeding, as definitely proved by careful dissection. It is interesting to note that fifteen species out of 107 are new to Guerrero. The results appear to justify my prediction of the numerous probable additions to the avifauna of Guerrero with further collecting (cf. Griscom, 'Ornithology of Guerrero,' Bull. Mus. Comp. Zool., vol. 75, pp. 367-422, January, 1934). This report is purely supplementary to that paper. All species common or already well known in Guerrero, are not listed and comment is confined to strictly new or interesting matter.

Penelope purpurascens purpurascens Wagler.—1 ♂, Omilteme. A little-known bird in western Mexico, here at an unusually high altitude.

Dendrotyx macroura striatus Nelson.—3 ♂, 2 ♀, Omilteme. A fine series of one of the rarest partridges in the New World. Only two specimens are definitely recorded: Nelson's type and a specimen, collected by Mrs. H. H. Smith, in the British Museum. There is no doubt but what we have in this series a subspecies strikingly distinct from typical *macroura*. It is much smaller, with a radically shorter tarsus and generally darker coloration throughout. This last is most noticeable on the underparts, which entirely lack the whitish ground color seen on the lower breast and abdomen of *macroura*. Nelson's claim that *striatus* differs in having the sides and flanks more heavily streaked with chestnut proves to be without foundation. It should be noted that both *griseipectus* Nelson and *oaxacae* Nelson have page priority over *striatus* Nelson, and come from closely adjacent areas. Good series of

these two forms are also badly needed before it can finally be settled just how many valid subspecies there may be.

Cyrtonyx sallei J. Verreaux.—1 ♀, Isguagilite, May 17, 1936. This rare Ocellated Quail is known from a mere handful of males; the only definite locality on record is Amula in Guerrero. The female has hitherto been unknown. The male is nearer to *montezumae* than to *ocellatus* in characters. Grant, in the 'Catalogue of Birds in the British Museum,' supposed that the female would resemble *montezumae*, but this proves not to be the case. My single specimen is not trenchantly separable from the female of *ocellatus* (!), and this development consequently endorses Mr. Peters's suspicion that *sallei* and *ocellatus* would prove to be subspecies of *montezumae* (cf. 'Birds of the World,' vol. 2, p. 57, footnote, 1934).

Porzana carolina (Linnaeus).—1 ♀, in breeding plumage, Omilteme, May 29, 1936, "ovaries slightly enlarged." The locality and the extremely late date would both appear to be remarkable.

Larus pipixcan Wagler.—1 ♂, in full breeding plumage, Mugileca, April 16. Already known as a transient to the Pacific coast of Mexico and the lakes in the central plateau.

Oreopeleia albifacies rubida (Nelson).—3 ♂, 4 ♀, Omilteme. There are now four subspecies of this Quail-Dove, of which *rubida* is perhaps the most distinct in its conspicuously more cinnamonous (less clay-color or grayish) underparts. While very slightly browner on the occiput than typical *albifacies*, this character is marked only in *anthonyi* Griscom of western Guatemala.

Oreopeleia montana (Linnaeus).—1 ♀, Jaleaca, June 6. The Ruddy Quail-Dove is well known from the tropical lowlands of Vera Cruz, but from western Mexico has been previously reported once only (Arroyo de Limones, Sinaloa).

Ara militaris mexicana Ridgway.—1 ♀, Omilteme. The only record for Guerrero is Acapulco on the coast.

Amazona finschi (Sclater).—3 ♂, 2 ♀, Rincon and Isguagilite. One of the many Tropical-Zone birds hitherto overlooked in Guerrero.

Striz varia sartorii (Ridgway).—1 ♀, Omilteme.

Ciccaba virgata amplexotata Kelso.—2 ♀, Omilteme and Isguagilite. This recently proposed subspecies, though possessing purely intermediate characters, is quite distinct and occupies a sufficient geographic area to be worthy of recognition.

Glaucidium minutissimum palmarum Nelson.—1 ♀, Omilteme, April 20. So rare a bird that an additional specimen is worth recording.

Chloroceryle americana septentrionalis (Sharpe).—1 ♂, 2 ♀. That this wearisomely common little kingfisher is previously unrecorded from Guerrero merely shows how sketchy is the exploration of this State.

Phaethornis longirostris mexicanus Hartert.—1 ♀?, Omilteme. A very distinct subspecies in its radically larger size and generally darker coloration. In spite of its name, it is only known from Guerrero and western Oaxaca, and would appear to be decidedly uncommon.

Campylopterus hemileucurus (Lichtenstein).—1 ♂, Omilteme. A characteristic Subtropical-Zone hummer, here at the extreme northwestern limit of its range.

Eupherusa poliocerca Elliot.—1 ♂ ad., 4 ♀, Omilteme. Probably the rarest of Mexican hummers in collections. This is apparently the fifth time it has ever been collected.

Lampornis amethystinus margaritae (Salvin and Godman).—33 ♂, 8 ♀, Omilteme, the great majority breeding. When Ridgway treated the hummingbirds in Part 5 (1911) of the 'Birds of North and Middle America,' this species (in the aggregate

sense) was very rare in collections, and hopelessly inadequate material apparently induced him merely to follow the old-fashioned criteria handed down from previous decades. It is of interest to recall that Ridgway's material was as follows: *amethystinus*, 9♂, no females; *brevirostris*, 2♂, no females; *salvini*, 2♂, no females; *margaritae*, 10♂, 2♀; *pringlei*, 3♂, 1♀. The group was divided into three 'species' on the basis of the color of the throat in males: *amethystinus* and subspecies *brevirostris* (Ridgway, 1908) and *salvini* (Ridgway, 1908) with throat purple to reddish or pinkish purple; *margaritae* with throat violet; *pringlei* with throat violet blue.

This situation proves to parallel that in *Amazilia violiceps*, where multiplication of species had proceeded to remarkable lengths. In *Lampornis* not only do three species boil down to one, but all these names cannot even be used for subspecific concepts. It follows, therefore, that Hartert ('Das Tierreich, Trochilidae,' pp. 114-115, 1900) was entirely correct in reducing three species to one. His only 'mistake' was possibly in not going far enough in the reduction of subspecies. My concept of geographic variation follows:—

1. Typical *amethystinus* Swainson. Type locality, Temascaltepec, Mexico. Range now known to extend north to Nuevo Leon, San Luis Potosi and southern Tamaulipas (Galindo). In reality a pale northeastern extreme, certain specimens minutely larger than any others from Mexico. Underparts in both sexes paler brownish gray than in any other race. Throat of adult males distinctly more reddish or pinkish purple than in any other race, the feathers more widely margined with buffy grayish, producing a distinctly squamate effect. Wing 65-71 mm.; culmen, 20-23.

All the remaining subspecies differ from *amethystinus* and agree minutely with each other in being much darker below (deep mouse gray to slate gray), and the throat feathers of adult males are more narrowly margined with paler, giving a less squamate effect. Immature females and males differ from adult females in having little or no cinnamonaceous on throat, a character which has been alleged to be specific. The usual individual variation in the relative bronzy or green tone to the upperparts has also been alleged as a specific character.

2. *salvini* (Ridgway). Highlands of Guatemala. Easily separable from typical *amethystinus* in its darker coloration below and slightly smaller size. Wing 64.5-66.5 mm.; culmen, 19-21. Throat of adult males more reddish, less pinkish purple. The relatively darker auricular area, and the broader, purer-white postocular streak are purely matters of individual variation and do not afford racial characters.

3. *nobilis* Griscom. Highlands of Honduras except the more eastern and coastal ranges. Even darker and much smaller than *salvini*, but throat of adult male as in *salvini*. Wing 59-64 mm.

4. *brevirostris* (Ridgway). Known from three localities only in western Mexico (Jalisco, Colima and Tepic). The female is unknown, and there are only two males in this country. The single male before me is indistinguishable from larger specimens of *salvini*! We have here consequently a most anomalous situation. The real facts are that *brevirostris* is an intermediate between typical *amethystinus* and *margaritae*, but very much nearer the latter, as later comment will show. It should be regarded as a synonym of the latter, unless a good series of adult males should show a miraculous constancy in the color of the throat, which is noticeably not the case with other subspecies.

5. *margaritae* (Salvin and Godman). Definitely including *L. pringlei* (Nelson, 1897) and probably also *brevirostris* (Ridgway). Originally described from Omilteme. Erroneously reported by O. T. Baron from Chilpancingo, but actually not occurring

nearer to this city than the mountains 2000 feet higher. The type of *L. pringlei* Nelson comes from fifteen miles west of Oaxaca City, Oaxaca; all other recorded specimens come from the mountains above Chilpancingo.

The great series of thirty-three perfect skins of breeding adult males before me reveals most interesting facts in individual variation. Twenty-nine specimens have violet or violet-purple throats and obviously agree with an old British specimen of *margaritae*. Three have violet-blue or bluish-purple throats and are consequently *L. pringlei*. One is even more interesting in that the throat is reddish violet, a shade exactly half-way between the color of *brevirostris* and that of *margaritae*. In the series of twenty-nine 'typical' *margaritae*, a number of specimens are variously intermediate toward the extreme of *pringlei*. It should be clear, therefore, that the specific character of *L. pringlei* is a purely individual variation of *margaritae*, that the alleged specific character in the throat color of *margaritae* is of subspecific value only, and that the throat color of *brevirostris* is so nearly approximated by the reddest extreme of *margaritae* as to impugn the sole character for this subspecies until a proper series endorses it.

To sum up, *margaritae* is an excellent subspecies, with the size of typical *amethystinus*, the darker coloration of *salvini*, and the throat of adult males always notably bluer or more purplish, less reddish violet.

Atthis heloisa heloisa (Nelson and Delattre).—2♂, Omilteme. Omitted in error from my previous list.

Aulacorhynchus prasinus wagleri (Sturm).—3♂, 1♀, Omilteme. While clearly only a subspecies of *prasinus*, *wagleri* is more different from the three other races of this toucanet than is any one of them from each of the others.

Grallaria guatemalensis ochraceiventris Nelson.—4♂, 2♀, Omilteme. Much the most distinct of the Middle-American subspecies of *guatemalensis*. The larger size is a character common to most of the endemic races of the Passeriformes.

Xenopsoides montanus variegaticeps (Sclater).—3♂, 2♀, Omilteme. This fresh series in connection with one (old and foxed) from southeastern Mexico and four from Guatemala induces me for the first time to believe that *idoneus* Bangs can be recognized. It was originally described as a specialty of the Volcan de Chiriqui, and Costa Rican birds were referred to true *variegaticeps*. This treatment proved untenable almost at once, and *idoneus* has been buried in synonymy ever since. While freely admitting the variable coloration of this species, it seems to me that good series from Honduras southward are distinctly darker especially below, more brownish or rufescent, less buffy or clay color, and above all the pileum is a browner, less pure gray, not in such sharp contrast to the color of the back, as is true of the most northern birds when recently collected and not foxed with age.

Automolus rubiginosus guerrensis Salvin and Godman.—1♂, Iguagilite, May 15, not breeding. While this bird clearly 'represents' the rare *rubiginosus* group, it is largely a matter of opinion whether to treat it as specifically distinct or not. It is, of course, strikingly different from *rubiginosus* and *veraepacis* in being paler and browner, less rufescent, throughout. The pileum is concolor with the back instead of rich chestnut in sharp contrast, and the wings are but slightly more rufescent than the back. Other forms farther south must also be considered in this connection. In particular *rufpectus* Bangs of Santa Marta bridges the gap between *veraepacis* and *guerrensis* to so surprising a degree that Hellmayr is undoubtedly right in combining all these birds under one specific name.

There are now enough specimens to appreciate the marked difference in coloration between adults and immatures. The latter are always paler, less richly colored

below, with the tawny, rufous or cinnamon tone to the throat and chest lacking or less clearly indicated. Ignorance of this fact in the past has led to the description of two other 'species,' *A. pectoralis* Nelson (= *guerrensis*), and *A. xanthippe* Davison, a synonym of *fumosus*. In this connection *umbrinus* Salvin and Godman of the Pacific Cordillera of Guatemala has enjoyed an unmerited reputation for distinctness, as its great rarity has prevented the discovery of the real facts. The original diagnosis correctly compared the young *umbrinus* with adult *veraepacis*, but fresh adults of the former are much less distinct. Thus the specimen from Chiapas and another from northern Honduras discussed by Hellmayr ('Birds of the Americas,' pt. 4, p. 215, footnote, 1925) are undoubtedly specimens of *umbrinus*, not *veraepacis*, and the respects in which they differ from real *veraepacis* furnish an excellent diagnosis for *umbrinus*, which now has a logical range from the mountains of Chiapas through the Pacific Cordillera of Guatemala to the mountains of central and western Honduras. This subspecies averages minutely paler, a little less richly rufescent on throat and chest, but the back is distinctly browner, with the chestnut pileum in sharper contrast. So far as yet known, *veraepacis* is confined to the highlands of Vera Paz, east of the Altos, in Guatemala. If it occurs elsewhere it should be sought in the ranges of eastern and northeastern Honduras, where alone other Vera Paz specialties have been discovered in recent years.

Xiphocolaptes promeropirhynchus omiltemensis Nelson.—2♂, 4♀, Omilteme. This excellent series of this distinctly larger, paler and duller subspecies, is far more different from *emigrans* of northern Central America than is *costaricensis* Ridgway.

Xiphorhynchus erythropygius erythropygius (Sclater).—1♂, Omilteme. The rarity of this bird in collections has made any study of geographic variation impossible up to the present time. It is now well known how variable are these woodhewers in coloration, but it has not been so clearly recognized that immature birds are astonishingly smaller than adults. The measurements in older texts consequently give a remarkable degree of individual variation. It is only in recent years that *erythropygius* has been proved to range commonly southward through Honduras to the mountains of north-central Nicaragua, so that the geographic gap between it and *punctigula* (Ridgway) is practically closed. The fine series available requires a slight modification of the currently alleged diagnostic characters:—

(a) typical *erythropygius* (Sclater).—Type from Jalapa, Vera Cruz. A rare bird, found north of the Isthmus of Tehuantepec only. Abruptly larger than more southern specimens; of duller, less greenish-olive coloration below; chin and upper throat whiter, barred with dusky; pileum more heavily spotted with buffy; back broadly streaked with buffy; underparts heavily spotted.

(b) *Xiphorhynchus erythropygius parvus* subsp. nov.—Type: no. 158,227, Mus. Comp. Zool., ♂ adult; Las Pefitas, south-central Honduras, February 17, 1933; C. F. Underwood.

Slightly richer, more rufescent brown above; more greenish olive below; chin and throat buffier, spotted with dusky; back less heavily streaked; abruptly and obviously smaller.

Series from Guatemala are intermediate in that they are duller colored and more heavily streaked on the back; the chin is whitish, but spotted; on the other hand they are smaller than Honduras series.

(c) *punctigula* (Ridgway).—Minutely more olive above and below; underparts less heavily spotted; intermediate between the two last in size; obviously different in that the back is unstreaked, or with a few small streaks on anterior portion only; pileum less spotted.

Table of Wing Lengths

Mexico: three adults, 122-125 mm.; two young, 108-109.5
Guatemala: eleven adults, 106.5-112.5 mm.; three young, 99.5-101.5
Honduras: ten adults, 110-118 (122) mm.; two young, 103-105
Nicaragua: one adult, 112 mm.

The differences in coloration are so relatively slight, that in spite of the minor differences between Guatemala and Honduras specimens, I prefer to recognize one smaller race only. The Honduras and Nicaraguan birds are in reality intermediate between *punctigula* and the Guatemala series. There is also an interesting zonal break: *erythropygius* is strictly a Subtropical-Zone bird from north-central Nicaragua northward; *punctigula* and *insolitus* are strictly humid Tropical-Zone birds of the lower levels from southeastern Nicaragua southward.

Attila spadicea cinnamomea (Lawrence).—1 ♂, Omilteme.

Empidonax difficilis salvini Ridgway.—3 ♂, 1 ♀, Omilteme. This is *bairdi* of my previous paper, a name which van Rossem has shown to apply to another species.

Megarhynchus pitangua mexicanus (Lafresnaye).—1 ♂, 1 ♀, Iguagilite. Previously unrecorded from Guerrero. These birds show no approach to *caniceps* Ridgway of Jalisco.

Xanthoura luxuosa vivida Ridgway.—7 ♂, 5 ♀, Iguagilite and Rincon. The subspecies of Guerrero Green Jays was left unsettled by Ridgway for lack of specimens. The present fine series is clearly *vivida* and shows no approach to *speciosa* Nelson, known from the type locality only, in Jalisco.

Aphelocoma unicolor guerrensis Nelson.—12 ♂, 8 ♀, Omilteme. This fine jay has previously been known from only the type series in the U. S. Biological Survey. While a very distinct race, it has no claims to specific distinctness whatever. As stated in the original diagnosis, it is a much darker, more purplish blue than typical *unicolor* of eastern Mexico, and consequently is still darker than *coelestis* of Chiapas and Guatemala. The phrase "much larger" must have been an inadvertence, as the measurements of the original series clearly show; the wing length averages only 3 mm. more, surely a minute percentage of 160 mm.; the tail, however, is appreciably longer in proportion. In coloration *guerrensis* is even darker than *griscomi* van Rossem of Salvador and western Honduras. This latter form averages larger than *unicolor*, but lacks the proportionately longer tail (cf. van Rossem, Auk, vol. 45, pp. 362-363, 1928).

Cyanolyca mirabilis Nelson.—3 ♂, 6 ♀, Omilteme. A beautifully distinct species, even though related to *nana* of eastern Mexico and *argentigula* of Costa Rica. To reduce these three isolated birds to subspecies seems to me to be carrying the 'formenkreis' theory to absurd lengths. An immature bird is a duller and grayer blue throughout, the chest is sooty below the white throat patch, instead of sharply black, and the pileum is also faintly tinged with sooty only, instead of sharply black. Previously known only from the type series of 3 ♂, 2 ♀.

Parus sclateri sclateri Kleinschmidt.—2 ♀, Omilteme.

Troglodytes brunneicollis brunneicollis Selater.—3 ♂, 2 ♀, Omilteme. In the review of this species in my previous paper (loc. cit., pp. 394-395) I commented on the fact that the only specimen from Guerrero was paler and duller than typical *brunneicollis* of southeastern Mexico, partly approaching *compositus* Griscom of Tamaulipas. The present series does not confirm the departure of Guerrero birds from the typical. As usual, adults prove to be less richly colored.

Henicorhina leucophrys festiva Nelson.—1 ♂, Omilteme. This well-marked sub-

species is a duller and paler-colored bird than *mexicana* with a less contrasted pileum. It is consequently even paler and duller than the much larger *capitalis* Nelson of western Guatemala.

Hylocichla guttata auduboni (Baird).—3 ♂, 2 ♀, Omilteme. Reported here because one of the males was collected on the astonishingly late date of May 1, 1936, "testes slightly enlarged." The assumption, however, that the bird was about to breed in the near vicinity, is entirely unwarranted on this evidence.

Catharus occidentalis fulvescens Nelson.—5 ♂, 6 ♀, Omilteme.

Catharus frantzii omiltemensis Ridgway.—3 ♂, 4 ♀, Omilteme. Previously known from the unique type only. We have here a most unusual case of convergence of characters. This subspecies is very distinct from its nearest relative, *alticola* Salvin and Godman of western Guatemala, in that it is a much paler and duller-colored bird especially below, and the russet tone of the pileum is so faint in the majority of the series as not to furnish any strong contrast with the olivaceous-brown back. Now it so happens that these characters are precisely those which separate *C. occidentalis fulvescens* Nelson from typical *occidentalis* of southeastern Mexico. To those familiar with both birds, *occidentalis* and typical *frantzii* are obviously distinct species, separable by color characters at a mere glance at skins in a tray. These differences, however, completely disappear in the two representative subspecies from Omilteme. The two series are virtually interchangeable, unless the real, fundamental specific characters are used. These are (1) the wholly yellow mandible in *frantzii*, whereas the terminal half of the mandible is blackish in *occidentalis*; (2) the inner webs of the bases of the remiges in *occidentalis* are abruptly buffy, forming a distinct buffy patch at the base of the spread wing, which is otherwise grayish on the under surface. These differences are much less pronounced in immature specimens.

Ridgwayia pinicola (Sclater).—3 ♂, 2 ♀, 1 juv. ♂, Omilteme. The discovery of possible geographic variation in this little-known thrush still awaits the assembly of adequate series of all three plumages.

Vireolanius melitophrys melitophrys DuBus.—1 ♂, Omilteme. Listed in my previous paper as *goldmani* Nelson. I have since shown (Ibis, p. 552, 1935) that the characters of this alleged subspecies were based entirely on the immature plumage of *melitophrys*.

Cardellina rubrifrons rubrifrons (Giraud).—1 ♂, 2 ♀, Omilteme.

Myioborus miniatus miniatus (Swainson).—2 ♂, 4 ♀, Omilteme.

Basileuterus belli clarus Ridgway.—1 ♂, Omilteme. Apparently the second time this bird has ever been collected. Distinctly lighter, brighter and yellower than *scitulus* Nelson of Guatemala, but I am not impressed by the "much longer tarsus."

Icterus melanocephalus melanocephalus (Wagler).—3 ♂, 2 ♀, Omilteme and Rincon. The tenth member of the genus to be recorded from Guerrero!

Piranga bidentata bidentata Swainson.—3 ♂, Omilteme. Provisionally referred here until the variations of the species in Mexico can be properly studied. Clearly not *sanguinolenta* (Lafresnaye), if this is properly represented by Vera Cruz specimens.

Hesperiphona abeillei abeillei (Lesson).—1 ♀, Omilteme. While new to Guerrero, this specimen shows no approach to the characters of the unique type female of *pallida* Nelson.

Saltator atriceps flavicrissus subsp. nov.—Type: No. 172,345, Mus. Comp. Zool.; breeding ♂; Isguagilite, Guerrero; May 15, 1936; W. W. Brown, Jr. Nearest to typical *atriceps* Lesson of Mexico, here restricted to Vera Cruz, but black pectoral

collar averaging broader, less broken with white feathers; white throat patch consequently averaging smaller; flanks less washed with brownish or olive; crissum and under tail coverts more olive ochraceous, less orange. 4 ♂, 2 ♀ from the type locality.

The Museum of Comparative Zoology happens to possess a practically perfect series of this species. Variation of plumage with age has never been properly brought out. Ridgway's description of the 'young' really applies to the juvenal just after being fledged. In this plumage the maxilla is yellow, the black of head, chin and chest is duller; the white throat patch is smaller, less sharply defined, and the feathers have a characteristically loose and fluffy texture. This plumage is followed by the very different immature plumage, in which the maxilla is still yellow, but the whole throat and chest is white with a varying amount of black feathers, where the pectoral collar should be. The specimens before me seem to show that the bill becomes black before the black pectoral collar is assumed. Two from eastern Guatemala, for instance, have no pectoral collar, but only the tip of the maxilla is yellow, while the majority of specimens of typical *atriceps* from Mexico and northern Central America without black pectoral collar have solid-black bills. It follows, therefore, that immature specimens of typical *atriceps* exactly resemble adults of *lacertosus* Bangs of Panama, which are devoid of a pectoral collar, and this subspecies is positively characterized by the gray instead of black auriculars. It is also most helpful to have skins of the same make-up. Fortunately again we have perfect skins by Brown from Vera Cruz, Oaxaca, and Guerrero. It should be clear that the width and distinctness of the pectoral collar would be affected by the degree to which the breast is stuffed or the head and neck bent backward.

Like a great many other birds of eastern Mexico, typical *atriceps* crosses the continent at the Isthmus of Tehuantepec and from there south occurs on the Pacific as well as the Caribbean slope of Central America; 53 specimens from the Isthmus south to Nicaragua are inseparable from 17 specimens from southeastern Mexico. The type and six other specimens from Yucatan and Quintana Roo represent *raptor* (Cabot), a notably paler bird below, adults of which apparently have a narrower and more broken collar than adult *atriceps*, though immature birds are, of course, indistinguishable in this respect. The type and fifteen other specimens adequately represent *lacertosus* Bangs.

It should be noted that this species is previously unknown in western Mexico, so it is not surprising that the Guerrero bird should prove separable.

*Museum of Comparative Zoology,
Cambridge, Mass.*

GENERAL NOTES

Birds vs. poison sprays.—Under the heading "Are arsenicals dangerous to game?" in 'Recent Literature' (Auk, vol. 53, p. 463, 1936) it is reported that partridges under experimental conditions were not seriously affected by eating poisoned insects. I do not wish to minimize the importance of this conclusion but to point out that this is only part, and perhaps not the most important part, of the question at issue. Though many birds can eat more or less liberally of insects containing ingested poison without showing toxic effects, it does not follow that the spraying of plants and orchards may always be indifferent to them. Consider the loads of poison adventitiously deposited on the backs, wings or elytra of insects in spraying or poisoning operations. A few such insects may well individually or in aggregate carry loads exceeding the poison toleration of the birds that eat them. Such insects may long be unaffected by these poison loads and thus carry their menace far from its point of origin. To feed birds with insects that have poisoned themselves with their food and to have them eat food well sprayed with the same poisons are two different operations. The former may be comparatively harmless but how about the latter?—P. A. TAVERNER, *National Museum of Canada, Ottawa.*

Some post-hurricane records from South Carolina.—On September 6, 1935, a hurricane of moderate intensity passed Charleston. The maximum wind velocity, as recorded by the local weather bureau, was forty-seven miles per hour. On the following morning, the bodies of a female Sooty Tern (*Sterna fuscata*) and an immature male Bridled Tern (*Sterna anaethetus melanoptera*) were found on the Isle of Palms beach. These are in my collection. This specimen of Bridled Tern is, as far as can be ascertained, the sixth and latest record for South Carolina.

Later, a bird which proved to be a Sooty Tern rose from the beach and flew to me. It was weak and very thin and sat placidly on the car seat by me, as I drove to Mt. Pleasant. For nearly three weeks this tern was fed on fresh fish, which it took readily from the hand. On September 24, it was banded and released on the Isle of Palms, when it at once flew rapidly away toward the south.

One dark and two white-breasted Frigate Birds (*Fregata magnificens*) soared for a while over our house in Mount Pleasant on September 7. Another (with white breast) was seen over the Isle of Palms on September 11. The remains of two Sooty or Bridled Terns were found on the same beach on the 11th, but could not be preserved.—E. VON S. DINGLE, *Mount Pleasant, S. C.*

Fulmar at Meaford, Georgian Bay, Ontario.—While working below the high clay banks west of Cape Rich, about ten miles north of Meaford, Ontario, on November 20, 1936, William Lin discovered a dead Fulmar which had obviously drifted ashore. Attached to a three-inch fish-hook caught in the bird's throat was a fish-line several feet long, which was tangled about the body, feet and wings. The specimen, in fresh condition, probably dead less than a week, was forwarded to the Royal Ontario Museum of Zoology in Toronto, where it has been preserved. Mr. L. L. Snyder informs the writer that this specimen, *Fulmarus glacialis glacialis*, is the third record for the Province and apparently the first for the upper Great Lakes region. The two previous Ontario records were for the Ottawa valley, in the eastern part of southern Ontario (Gormley, Auk, vol. 41, pp. 470-471, 1924; Snyder, Auk, vol. 46, p. 376, 1929).—L. H. BEAMER, *Meaford, Ontario.*

Snowy Egret in southern Michigan.—On August 2, 1936, Mr. L. Whitney Watkins, residing some six miles southwest of Manchester, Michigan, sent me word

that there were present on his ponds twelve American Egrets (*Casmerodius albus egretta*) and one Snowy Egret (*Egretta thula thula*). On August 4, I flushed the little egret at a distance of sixty yards when its bright-yellow feet and black tarsi were strikingly apparent. It then perched in plain view on a bare limb of a tree about 150 yards away and was carefully inspected by Mr. Watkins and myself by means of a 20-power telescope on a tripod. The yellow feet and lores were plainly visible; the plumes on the neck and back were such as I have observed on early-winter adults in central Florida. On August 6 this Snowy Egret was observed by Pierce Brodkorb and Thomas D. Hinshaw of University of Michigan Museum of Zoology, both of whom confirm my determination of the bird. Mr. Watkins later reported that this egret remained in the vicinity for three weeks. It was on these ponds that Mr. Watkins collected in 1894 the first Michigan specimen of 'Cory's Least Bittern' (*Izobrychus neozenus*)—see Auk, vol. 12, p. 77, 1895.

The present record of an adult Snowy Egret is of particular interest as all previous authentic records of this species in Michigan and Ohio appear to have been of immature birds. The Snowy Egret reported collected by L. W. and B. R. Campbell, in Monroe County, Michigan, August 10, 1935, was an immature bird although not specifically so reported in the published record (Auk, vol. 52, p. 322, 1935). This record seems to be the first authentic report of the species in Michigan, for since its publication, F. W. Rapp, Vicksburg, Michigan, has written the Museum that he had observed at close range on three different days, August 20-22, 1924, the white herons reported as egrets by Benjamin O. Bush and that they were certainly immature Little Blue Herons (*Florida caerulea caerulea*) with "plumage white, bill for about one third of the way back from the tip black, then gradually lighter toward the base, legs and feet greenish-yellow all over. These birds had a favorite post on which they would perch within about five rods of my place of concealment where I examined them with a glass." Thus Mr. Rapp has disposed of this long-suspected record.

One who has observed the actions and habits of the Snowy Egret can hardly mistake an immature Little Blue Heron for it. The Snowy Egret is very active and frequently exhibits unusual intelligence in its pursuit of food. Compared with it the Little Blue Heron is a sluggish dullard. Several recent reports in 'The Auk' of the Snowy Egret in flight picking food off the water give evidence of its intelligence and agility. I have seen this species perform this feat near Tampa Bay, Florida, flapping back and forth across a deep ditch some twenty feet wide, while American Egrets and Louisiana Herons (*Hydranassa tricolor ruficollis*) stood on the bank looking on.—WILLIAM G. FARGO, University of Michigan Museum of Zoology, Ann Arbor, Michigan.

Number of Contour Feathers of *Cygnus* and *Xanthocephalus*.—In view of the recent interest in numbers of contour feathers it may be worth while to record two additional counts:

Species	Sex	Date	Number of feathers	Weight of bird	Weight of feathers
Cygnus	?	Nov. 5, 1933	25,216	6123.0 grams	621.0 grams
Xanthocephalus	♂	Sept. 2, 1935	4,342	85.5 grams	7.5 grams

The Whistling Swan (*Cygnus columbianus*) was collected in Erie Township, Monroe County, Michigan. The feathers were counted by Pierce Brodkorb, Leonard W. Wing, William J. Howard and myself. The only feathers not actually counted were those along the margin of a cut in the neck, estimated to be 1200, and those of

the right wing. The latter was estimated by using the number of feathers counted on the left wing, which is 609. It is interesting to compare the number of head and neck feathers (20,177) with those on the rest of the bird (5039). Many on the neck, breast and back were in the pin-feather stage.

The Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*) was taken in Clay County, near Ruthven, Iowa. Its feather count is considerably higher than that of any passerine bird in Dr. Alexander Wetmore's list (Auk, vol. 53, pp. 159-169, 1936). This may perhaps be accounted for by the fact that it was in fall plumage.—GEORGE ANDREW AMMANN, *Museum of Zoology, Ann Arbor, Michigan*.

Injury-feigning by a Wood Duck.—In the spring of 1936 I had an unusual opportunity to observe injury-feigning in a Wood Duck (*Aix sponsa*). The observation is of particular interest because the injury-feigning was done to save the young from the attack of a natural enemy, in this case a Red-shouldered Hawk (*Buteo lineatus*). The food habits of the latter are well known to be mainly beneficial, yet with a nest full of hungry young to feed, a hawk cannot be expected to pick out for food those creatures only that man considers undesirable. In any event, here in Fairfield County, Connecticut, the Red-shouldered Hawk is at present a much scarcer breeding bird than the Wood Duck.

The incident occurred in an area where a mature woodland of oaks and other broad-leaved trees borders a wooded swamp. A pair of Red-shouldered Hawks had built their nest in a black oak that stood on the border of the swamp. On the date of my observation, May 20, the hawks had young in their nest, while broods of young Wood Ducks a few days old were to be found on the waters of the swamp, in the company of their mothers. Early that morning as I approached the vicinity of the hawks' nest, I heard the call of a female Wood Duck,—a series of loud squeaky notes that sounds like the badly worn brakes of an automobile. Peering over the bushes, I saw a brood of nine young Wood Ducks following their mother in single file across a bit of open water. I had barely caught sight of them when the hawk descended upon the brood and they scattered in every direction to the shelter of swamp vegetation. The mother instantly extended her head and neck upon the water, turned on one side, flapped one wing in the air and paddled about in circles as though quite helpless. The hawk immediately turned and struck at her, but somehow she managed to get behind a clump of bushes, with which the hawk, missing its stroke, collided. It then perched on a stump and watched till the duck appeared in the open again, when it attacked a second time with the same result. This continued, the hawk returning to the stump and renewing its attack either four or five times, but in the excitement I lost count. At one time two of the young ducks left their hiding-place and scurried across the water to another, but the hawk was so interested in the frantically flapping mother that it paid no attention to them. All of this action took place within fifty yards of where I stood. The vegetation was so thick that I could have seen little or nothing had it been much farther away. Soon, however, the duck moved to a point where I could not see to advantage, and as I changed my position, the hawk saw me and flew away. The mother duck then resumed her normal posture and called to her brood. The young came out from their hiding-places and followed her off through the swamp where they were soon out of my sight.

The behavior of the mother duck in this observation was marvelous to me. Over and over she deliberately came out into the open a short distance from the hawk, and seemed to invite its attack. She skilfully avoided every attack and yet all the time maintained the attitude of complete helplessness. She was evidently enticing the hawk gradually away from the vicinity of the young when my movement inter-

rupted the proceeding. I believe that if this interruption had not occurred, she would have succeeded in leading the hawk away, and would then have escaped from it and returned to her brood.—ARETAS A. SAUNDERS, 48 Longview Ave., Fairfield, Conn.

King Eider taken on Illinois River.—On November 21, 1936, a young male King Eider (*Somateria spectabilis*), was killed at Henry, Illinois, on the Illinois River by J. Andrews King, who presented it to Field Museum. The bird had been shot and was unable to fly; from its emaciated condition it must have been in the vicinity of Henry at least ten days. The King Eider is an extremely rare visitor to southern Lake Michigan, and this is the second bird ever recorded on the Illinois River. In 1874, an adult female was obtained at Chilicothe, Illinois (Cory, 'Birds of Illinois and Wisconsin'). Besides this record, Cory also lists a specimen shot on the Mississippi River near Keokuk, Iowa, in November 1894, and six specimens taken in Wisconsin: Racine 1, Milwaukee 4, Lake Sheboygan 1. Several more were taken off Navy Pier, Chicago, November 29, 1917, by C. W. G. Eifrig ('Birds of the Chicago Region,' by Ford, Sanborn and Coursen).—LESLIE WHEELER, *Field Museum of Natural History, Chicago, Illinois.*

The Type of *Falco cooperii* Bonaparte.—Among the ornithological rarities which it was my privilege to examine when visiting the Muséum d'Histoire Naturelle in Paris during the summer of 1933, was Bonaparte's type of the Cooper's Hawk. It is a mounted bird, the only specimen of the species, so far as I could determine, which came to the Muséum with the Bonaparte collection. It matches very closely, in fact almost exactly, the Bordentown, New Jersey, individual described by Bonaparte and figured in Plate 10, figure 1, of 'American Ornithology,' vol. 2, 1828. The only apparent differences between the plate and the mounted bird are that the latter has the head only slightly turned and the whole plumage is badly stained and discolored with soot. It is, of course, a young bird, obviously in its first fall plumage, narrowly streaked below, and is a typical example of the nominate race of eastern North America.

Written data concerning the specimen are rather meager but are pertinent. On the bottom of stand on which the bird is placed, is written, obviously many years ago: "Etats Unis Coll par l'Prince Ch. Bonaparte, C. G. 1854—1136 [that is, 1136 of the general catalogue for 1854, a year in which a great many specimens from the Bonaparte collection were incorporated into the museum collection] 608 ♂ *Accipiter cooperi* Bp. Type d' l' espèce et de la pl. Amer. Ornith. vol. 2. pl. 1." The number 608 refers to the new catalogue and this, as well as the data following, were written rather recently. Measurements as taken by me are: wing, 235; tail, 200; culmen from cere, 16.3; tarsus, 67.0; middle toe without claw, 36.0 mm. These so closely approximate those given by Bonaparte in his description that, taken in combination with the characters and attitude of the mounted bird, there would seem to be no doubt that the Paris bird is the actual type specimen.—A. J. VAN ROSSEM, *Dickey Collections at the California Institute of Technology, Pasadena, California.*

Dusky Grouse in the Chuska Mountains of northeastern Arizona and northwestern New Mexico.—On June 21, 1936, a pair of Dusky Grouse (*Dendragapus obscurus obscurus*) was seen eight miles southeast of Lukachukai, Apache County, Arizona, approximately four miles from the New Mexico state line, at an elevation of approximately 8800 feet on a steeply sloping, southeasterly exposed canyon wall. The vegetation was dominantly *ponderosa* pine and Engelmann spruce with underbrush of oak, aspen, *Symphoricarpos*, wild rose, cliff rose, ferns, *Cercocarpus*, and small Douglas fir.

The hen was seen first at a distance of about ten feet. She merely clucked and walked slowly away among some clumps of underbrush and stopped behind a small bush about thirty feet from where she was started. Approximately one hundred feet up the trail the male was encountered. On being disturbed he squawked and flew about thirty feet up to a horizontal limb of an open *ponderosa* pine where he perched for about fifteen minutes jerking his head this way and that, apprehensive, but not excited. Both individuals were extremely tame and apparently had never been molested by human beings. The Navajo Indians inhabiting this area during the summer do not hunt game birds unless taught to do so by the white man.

Mrs. Florence M. Bailey ('Birds of New Mexico,' p. 198, 1928) does not give the Chuskai Mountains as former or present range of Dusky Grouse. She records the bird on top of Mount Taylor and in the Zufii Mountains but states that they are apparently no longer found there. It is of great interest to learn that this valuable game bird is still present in this area.—PAUL PHILLIPS, *U. S. Soil Conservation Service, Gallup, New Mexico.*

Young Black Rail banded in Illinois.—Authentic records of Black Rails (*Creciscus jamaicensis stoddardi*) in Illinois are so few, that the following items from Adams County are of interest. The first mature specimen I ever saw, was collected by O. C. Poling in May, 1896. On August 22, 1932, I captured and banded two immature Black Rails. On July 25, 1936, I was called to the garden of a yard in Quincy to see a "strange bird." Here I spied an immature Black Rail hiding under the leaves of a canna plant. We drove the bird under a minnow net and thus effected its capture. It was five inches in length, with characteristic red eyes and in typical juvenal plumage. The bird was banded with band no. 36:149101 and then released. The fact that I have captured immature birds twice recently, during the summer months, suggests that Black Rails probably nest here yearly.—T. E. MUSSELMAN, *Quincy, Ill.*

Willet in Arkansas.—In 'The Auk' of October, 1936, I reported the Eastern Willet from this section. Recently two skins collected during May, 1936, together with one taken in September, were sent to Dr. H. C. Oberholser of the Biological Survey at his request. He identified them as Western Willet. Willets were seen here August 16, 17, 21, 23, 26, and September 15, 1936, a single bird at each observation except on August 17 when a group of six was seen. The Western Willet has been reported from Arkansas but once, March 29, 1886.—WILLIAM H. DEADERICK, *36 Circle Drive, Hot Springs, Ark.*

Gulls and Sunfish.—The strangely formed Sunfish, *Mola mola*, of our Pacific coastal waters often lies horizontally on its side at the surface, with one of the small, narrowly triangular fins held vertically erect in the air at right angles to the dorso-ventral plane of the body,—a curious habit, since the fin is too small to be effective as a sail: at most, it could do no more than revolve the heavy, circular body where it lies. On December 9, 1935, while hunting pelagic birds about twenty miles off Santa Cruz, California, I noticed a Sunfish in this position with a Western Gull (*Larus occidentalis*) sitting on the water so close, that its breast feathers must have touched the fish, which it pecked hard at intervals of a few seconds. Drifting down from windward, I was able to gaff the fish, which was about fifteen inches in diameter, vigorous, and without injury, but rather heavily infested with amorphous, jelly-like copepods, 'fish-lice,' doubtless *Lepeophtheirus nordmanni* or *L. insignis*, which are known to be parasitic on the species. The pearly surface showed a few clusters of vague white marks, such as could be duplicated by a light scratch of the finger-

nail, where parasites had been removed. I laid the note away and forgot it for a year, until on December 3, 1936, when between five and ten miles off Monterey, I saw the whole performance repeated once, though I could not catch the fish, and several time noticed gulls sitting close to the Sunfish without pecking it. Furthermore my friend, Mr. Frank Lloyd, who is daily at sea off Monterey, told me he had seen the same occurrence many times. The Sunfish lie motionless, as though appreciating this marine-cowbird function of the gulls.—T. T. McCABE, Berkeley, California.

Short-billed Gull in Massachusetts.—In the Museum of Comparative Zoölogy there is a skin of a gull that came with the Brewster collection. It was originally labelled *Larus delawarensis* ? and has been kept with the Ring-billed Gulls. While examining this bird recently, I was struck by its very small bill and some peculiarities of plumage not associated with *L. delawarensis*. Comparison of specimens quickly lead to its identification as some form of *Larus canus*. *L. c. kamtschatschensis* (Bonap.) is a much larger bird than this one and need not enter into consideration, but whether the bird should be referred to true *L. canus* or to *L. canus brachyrhynchus* is not so easy to decide. The bird is in a transition plumage between the 'first nuptial' and 'second winter' and cannot be quite matched by available specimens of either race; the streaking on the top of the head, however, is much heavier than in western European examples and for this reason should, I think, be referred to *L. c. brachyrhynchus* of western North America.

The specimen in question, a female, was shot at Pleasant Bay, Chatham, Massachusetts, February 8, 1908, by N. A. Eldredge. It was acquired by Charles J. Paine, Jr., who gave it to William Brewster about a year later. It now bears the Museum of Comparative Zoölogy number 248,842. In the Brewster catalogue is the following entry in the 'remarks' column in Brewster's own hand: "Bill small for *delawarensis*; bird may be *canus* or *brachyrhynchus*!"—JAMES L. PETERS, *Museum of Comparative Zoölogy, Cambridge, Mass.*

Forster's Tern on the Niagara River.—Published reports, and indeed any form of record of the occurrence of Forster's Tern (*Sterna forsteri*) in the Niagara district seem sufficiently rare to warrant the following note. While travelling in company with Mr. F. W. Gregory from Niagara Falls, Ontario, to Fort Erie, via the Niagara River boulevard, on October 19, 1936, we saw among other Laridae, such as Ring-billed Gulls, Herring Gulls, and Bonaparte's Gulls, about one dozen terns in several small scattered parties. Although not by any means without precedent, the presence of terns on the river at this season was interesting. An opportunity for careful observation occurred at a point where Frenchman's Creek enters the Niagara River, and here a small party of terns was examined at very close range. Three immature, or completely winter-plumaged birds, were found to be definitely referable to the species *Sterna forsteri*. The diagnostic character of the white head, with elongated black patch through the eye only, was most plainly and repeatedly shown when the birds hovered with down-pointed bill, and dived within a dozen yards of the river bank. A fourth bird, more or less in company at the time with the Forster's Terns, was almost certainly an adult Common Tern changing into winter plumage with a whitish forehead and black cap extending over the back of the head. The several other small parties of terns seen hovering over the river, and diving, but not closely observed, may or may not have contained other examples of *Sterna forsteri*; but a rather distant glimpse of one small group of five birds, obtained while driving along the boulevard, left me with the impression that they were not all

of the common species, and that one at least was in all probability a Forster's Tern. The only other recent reports known to the writer of the occurrence of Forster's Tern on the Niagara frontier have appeared as records of single birds reported by the Buffalo Ornithological Society in their mimeographed journal, 'The Prothonotary.' One of these records, concerning a bird of this species seen at Fort Erie on September 21, 1935, has already been commented upon by the writer elsewhere (Sheppard, Hurlburt, and Dickson, 'A preliminary list of the birds of Lincoln and Welland Counties, Ontario,' Canadian Field Nat., 50: 131, 1936), while the other relates to a more recent report of another single example, seen at Niagara Falls on September 16, 1936.—R. W. SHEPPARD, 1805 Mouland Avenue, Niagara Falls, Ontario.

Royal Tern in Massachusetts.—On June 21, 1936, I was studying straggling shore-birds on the great flats of Monomoy, south of Chatham, Cape Cod, and turned idly to examine a large group of terns and gulls of various species resting on the mud at the edge of the water. Looming up among the terns, I was astonished to see a larger tern with an all-red bill. It was at first supposed to be a Caspian Tern, but the bird was not large enough, the bill was too light and red, and above all not proportionately any deeper or stouter than those of the adjacent Common Terns. Also the tail was long and deeply forked, projecting way beyond the closed wings. On approaching closer to flush the bird, the best field character was positively noted, the lack of black or dusky on the under surface of the spread wing in flight; also the generally more slender build and more buoyant flight. The bird was obviously a Royal Tern (*Thalasseus maximus*) in full nuptial plumage, as the forehead was not white. There are but three records for the State, all in the month of July. With the great increase of this species on the south Atlantic coast in recent years, the Royal Tern should be expected farther north as a rare spring and summer straggler. Observers, therefore, should be on the lookout for it. The more important field characters have consequently been stressed in this note. The wing character is omitted in practically all standard text-books, which give the wholly erroneous impression that the Royal Tern is a difficult bird to identify in life, on fine points of relative size and proportions.—LUDLOW GRISCOM, Museum of Comparative Zoölogy, Cambridge, Mass.

Black Tern in Maryland.—On June 9, 1935, while in western Maryland, I visited a trout pond belonging to James Todd of New York, located at a high altitude near Grantsville, Maryland. While fishing this pond from early afternoon until dark I observed two Black Terns (*Clidonias nigra surinamensis*); they stayed near me, sometimes only fifteen or twenty feet away, until I left the pond and it was too dark to see. Those who resided on the property told me these birds had been there since the spring. I am inclined to think they bred there. I was in that section June, 1936, but regret that I was unable to get to this pond and see if these tern had returned.—TALBOTT DENMEAD, U. S. Bureau Fisheries, Washington, D. C.

Black Skimmers in New England.—The striking and unmistakable Skimmer (*Rynchops nigra*) has not been seen in New England since the great invasion after the hurricane of August 26, 1924, when it occurred as far north as Nova Scotia, and remained over a month in Massachusetts waters. The status of the species has changed notably in the past twelve years. There are now flourishing breeding colonies on the New Jersey coast, and in the past few years a small nesting colony has started on Long Island. Should this increase continue, it is within the bounds of possibility that future decades may see it return as a breeding bird to Massachu-

setts. In the meantime it can confidently be expected to occur more frequently as a straggler. The evidence of the past season supports this contention. A notable southern hurricane raged on the New England coast on September 18 and 19, 1936. While Skimmers were reported on the coast after this hurricane, the species actually reached Massachusetts well before it. Thus on Sunday, September 6, 1936, a large party of us (Messrs. Hagar, Scott, Garrison, Bishop, Hinchman, Dr. and Mrs. Tousey, and Mr. and Mrs. Maclay) found an immature Skimmer resting on the great flats of Monomoy with terns and gulls at high tide. The following Wednesday, Monomoy was visited independently by two parties, Mr. and Mrs. Maclay, and Professor S. A. Eliot, Jr., and Mr. Davis Crompton. Both saw three Skimmers, two adults and one immature. The young Skimmer was noted by other equally large parties on September 12 and 13, always at high tide, never at low. Additional observers on these dates were Mrs. Fuller, Miss Juliet Richardson, and Messrs. Taber and Ward. On September 20, after the hurricane, Monomoy was visited by Dr. and Mrs. Tousey, Mr. Hagar and Mr. Garrison, who found four Skimmers. These birds were still present on the 22d (Griscom, Hagar, Garrison) and on the 23d two were collected by Mr. John D. Smith for the Boston Society of Natural History. It will be apparent, therefore, that the hurricane had little if anything to do with the presence of Skimmers at Monomoy. Another report is equally inconclusive. Mr. F. L. Jaques of the American Museum of Natural History kindly wrote me that on September 24 at Eel Point, Nantucket, he saw twelve to sixteen Skimmers. Unfortunately this coast was entirely unwatched all summer, so that these Skimmers may have been there for an indefinite period prior to the hurricane, for all we know to the contrary. No such doubt, however, attaches to the record of three Skimmers on the beach at Little Compton, Rhode Island, on September 20, and kindly reported to me by the ever-active Mr. Roland C. Clement, who 'covers' this territory with exemplary frequency and care. The occurrence of these birds so far 'inside' furnishes the second record for the State.—LUDLOW GRISCOM, *Museum of Comparative Zoölogy, Cambridge, Mass.*

Dovekie in South Florida.—During the early part of January, 1937, the writer was in the Florida Keys in connection with his work with the Audubon Association. While at Tavernier contacting the warden who patrols the Upper Keys, he was told by this man that there had been an invasion of many little sea-birds unknown to the natives. On Christmas Day, 1936, a Mr. G. Donaldson saw six of them in the water at Whale Harbor, a few miles east of Tavernier, swimming about and apparently very weak. He succeeded in catching one, which he brought to Tavernier and turned over to our warden, James Durden. This bird was liberated near the dock on the bay side of the key. Next day, it had come ashore again, and was again put in the water by him. The writer also talked to Judge Lowe of Tavernier, and was told that this gentleman had seen two of the birds in the canal which empties into Card's Sound just where the Over-seas Highway crosses on the long bridge. This was in Dade County, whereas the former birds occurred in Monroe County. Judge Lowe's birds were seen shortly after Christmas.

A few days later the writer was in Everglades, on the west coast, in Collier County and was presented with a skin of a Dovekie (*Alle alle*) by one of the wardens of the Southwest Coast Patrol of the Audubon Association. He had procured it from a certain Jesse Griffin, of Marco, Florida, who had picked up the bird dead on the beach near Jupiter Inlet, St. Lucie County (east coast) on December 27, 1936. Griffin had stated that there were "thousands" of the birds, most of them alive and frequenting the bays, inlets and creeks near the ocean. He saw some die in the surf

as they were rolled about by the waves, and all appeared to be in an exhausted condition. The birds seen on the Keys were, of course, of this species.

This is a parallel case to the Dovekie invasion of south Florida in December, 1932, but differs in that there has been no stormy period which would have brought these far-northern birds to the tropical zone. The writer knows of no record about Charleston, South Carolina (where he resides), and none for Georgia, though there may be some unreported. There was a report made to the Charleston Museum that many Dovekies had been seen off Cape Hatteras in December, 1936, but this is some hundreds of miles north of Charleston and far indeed from the lower east coast of Florida. The occurrence of the Dovekie in the latter locality is no less than phenomenal, and constitutes an amazing circumstance.—ALEXANDER SPRUNT, JR., *R.F.D. 1, Charleston, S. C.*

Simoxenops proposed for Anachilus.—My colleague, Dr. W. Meise, of the Staatliche Museen für Tierkunde und Völkerkunde, Dresden, kindly calls my attention to the fact that my *Anachilus* (Amer. Mus. Novitates, no. 332, p. 11, Oct. 31, 1928) proposed for a new genus of furnariine bird from Perú, is preoccupied by *Anachilus* Leconte (Smithsonian Misc. Coll., vol. 3, no. 3, p. 175, 1861) in Coleoptera. I therefore propose to replace *Anachilus* with **Simoxenops**.—FRANK M. CHAPMAN, *Amer. Mus. Nat. Hist., New York City.*

Arkansas Kingbird on Matinicus Isle, Maine.—From September 1 to 3, 1936, I visited Matinicus Isle, which is twenty miles out at sea from Rockland, Maine. Matinicus is a famous center for the study of sea birds; William Dutcher, H. K. Job, T. Gilbert Pearson, and others have made observations there. Apparently rare species not maritime may also blow in. It is interesting to note that Ernest Young of Matinicus says that he and a few others saw a Scissor-tailed Flycatcher (*Muscivora forficata*) there in June, 1936. Mr. Young says it was observed for several hours, and he accurately describes the snapping of the scissor-tail.

On September 1, I found an Arkansas Kingbird (*Tyrannus verticalis*) on a wire fence by the shore with five Eastern Kingbirds (*Tyrannus tyrannus*). For about fifteen minutes I observed the bird with eight-power binoculars, from a distance of twenty feet. When I came nearer the Eastern Kingbirds flew away, but the Arkansas Kingbird remained; so I walked up to within eight feet and took a picture of it. The camera was a miniature, a Kodak Vollenda. The enlarged print shows the bird very plainly, making identification certain from the photograph alone. After the bird left the fence it would no longer allow a close approach. It was still in the vicinity on September 3.

Arthur H. Norton of the Portland Society of Natural History has very kindly provided me with the records of the Arkansas Kingbird in Maine. It has been collected three times: at Eliot in October, 1864 (Bull. Nuttall Ornith. Club, vol. 1, p. 73, 1876); at Woolwich on November 24, 1925 (Haven, Auk, vol. 43, p. 371, 1926); and at Biddeford Pool on November 3, 1935 (Robbins, Bull. Boston Soc. Nat. Hist., no. 78, p. 74, 1936). There have been four sight records: at Hallowell from November 12, 1920, to January 15, 1921 (Miller, Auk, vol. 38, p. 603, 1921); at Cutt's Island, Kittery, on August 25, 1925 (Townsend, Auk, vol. 43, p. 99, 1926); at Saco from December 1 to 6, 1925 (Abbott, Maine Naturalist, vol. 5, p. 166, 1926); and at Somesville, Mount Desert Island, on September 10, 1934 (Tousey, Bird-Lore, vol. 36, p. 369, 1934). A record substantiated by a photograph seems to fall in a class by itself.—ARTHUR W. KUSCHKE, JR., *181 North Franklin St., Wilkes Barre, Penna.*

The Status of *Telmatodytes palustris iliacus*.—A few years ago while working on the natural history of the Long-billed Marsh Wren (*Telmatodytes palustris*) the

writer attempted to establish the ranges of the various forms. In studying skins of these races it became apparent that *T. p. dissaeptus* Bangs could be divided into two readily recognizable groups. The western birds have lighter-colored upper parts and much brighter cinnamon-buff to cinnamon flanks and sides than the eastern birds. In winter plumage the 'foxy' brown is a very good distinguishing mark as it is strikingly different from the russet or wood brown of the eastern group. The western birds were described by Ridgway as *T. p. iliacus* and this form unquestionably should be recognized as distinct from *T. p. dissaeptus*.

Summer specimens of *T. p. iliacus* were examined from: English Lake, Indiana; Lake Koshkonog, Wisconsin; Staples, Verndale, St. Cloud, and Minneapolis, Minnesota; Rock Lake, North Dakota; Omaha, Lincoln, and Jamaica, Nebraska; Charleston, Missouri; Shoal Lake, Manitoba. Summer specimens of *T. p. dissaeptus* were examined from: Wayland, Massachusetts; Ithaca, North Spencer, Fairview, and Montezuma, New York; Erie, Pennsylvania; Perry and Fairfield Counties, Ohio. The average measurements of twenty-nine adult males of *T. p. dissaeptus* were: wing, 52.01 mm.; tail, 41.88; exposed culmen, 14.50; tarsus, 19.79. The average measurements of fourteen adult males of *T. p. iliacus* were: wing, 51.14 mm.; tail, 42.15; exposed culmen, 14.43; tarsus, 19.82. *Iliacus* is a slightly smaller bird as is also indicated by body weight. Thirteen specimens of *dissaeptus* averaged 12.98 grams while eight specimens of *iliacus* averaged 12.52 grams.—WILFRED A. WELTER, State Teachers College, Morehead, Kentucky.

Notes on Starling spread and migration.—Much has been written on the Starling (*Sturnus vulgaris*) in America. One of the most interesting problems it presents is the development of definite migratory movements correlated with its spread and increase in numbers. We have here set before us a large-scale experiment bearing on the origin of bird migration such as is not likely to be repeated for many years. The more attention the problem receives at this time, the more fully shall we have availed ourselves of this opportunity. Not only should more data be gathered but the facts already assembled should be fully discussed, so that none that is pertinent will be overlooked.

A most significant contribution to the understanding of Starling migration is to be found in a map of recoveries of Starlings banded at a concentration point in Ohio (Thomas, Bird Banding, vol. 5, p. 121, 1934) from which we see that there is a considerable inland movement in a northeast-southwest direction. It is at once apparent first, that this migration does not follow any probable line of invasion by the bird in its spread from New York City; second, that it does follow the common direction of European migration.

To understand Starling spread and movements, relative numbers at all points in the bird's range are important. We fortunately have some such winter data for the past in 'Bird-Lore' census reports, and these have been compiled for me in tabular form by Hope R. Bennett, and are now being studied. Furthermore, the Starling is so conspicuous and easily identifiable, that the estimated numbers per mile noticed over any considerable distance (say 100 miles) travelled by rail or road at various seasons should give a fairly reliable index of comparative abundance in different sections. The winter concentration as shown in 'Bird-Lore' Christmas Census reports in the early stage of the bird's spread is of much interest. Its numbers expanded in a northeast-southwest direction. It invaded Connecticut, Long Island and New Jersey almost simultaneously and was delayed in its advance up the Hudson Valley. It appeared in Connecticut and New Jersey in the 1904 Census and had reached Pennsylvania in that of 1908.

Computation of census figures shows a noticeably more advanced phase in the Starling's spread and increase in 1913-16, over that in 1905-11. It has now touched Vermont and is in Massachusetts and Rhode Island; it reaches north to Poughkeepsie in the Hudson Valley in 1915, north to Albany and southwest to the District of Columbia in 1916. In 1913-16, in Connecticut, the numbers vary by years from 73.1 to 170 (average 121), per report where it is present, and it is present in from 83 to 92 per cent (average 89) of the reports. In New Jersey the numbers vary from 64.6 to 130 (average 95), and it is present in from 73 to 100 (average 88) per cent of the reports.

In these two States from 1917 to 1936, the Starling was present in some 94 per cent of the reports; and averaging the five-year periods, 1917-21, 1922-26, 1927-31, 1932-36, one may compute figures of 166.3, 169.8, 298.2, 159.5, respectively, per report for Connecticut, and 87.3, 285.0, 384.4, 728.3 for New Jersey. The winter concentration in Connecticut seems to have approached a norm twenty years ago whereas that in New Jersey has steadily risen to the present time.

The writer's present hypothesis is that there was through the early years a more or less seasonal, irregular, pendulum movement of Starlings back and forth along the northeast-southwest Connecticut-New Jersey axis which finally extended the winter range of the bird as shown in the 1916 Census from eastern Massachusetts to the District of Columbia. This presumably differed from established migration, especially in that individuals were stopping to breed or to winter at points along the line. One may assume that at the same time, a more local expansion into breeding and contraction into wintering areas occurred, and these two seem to be the factors on which its true migration is building. There is little question that a sharp increase of Starlings in their main central axis shown for 1913-16, is correlated with northeastward extension for the same period, and this was presumably due in part at least to southwestward migration from newly occupied territory in that direction. As to the final attainment of the Mohawk Valley at Albany in the 1916 Census, which might be looked upon as an important step in the Starling's campaign of occupation, three hypotheses present themselves: gradual cumulative spread northward from the center of distribution; northward flow when the population in the lower Hudson Valley rose to a certain concentration; or, what seems quite likely, deflection of some of an increasing number of birds moving along the main northeast-southwest axis.

Those cognizant of what has been written of the Starling's spread will realize that this is merely evidence from one set of data. But to carry it a little further, the Starling is at Albany in the 1916 Census, at Rochester and Buffalo in that of 1922, evidently having extended there through the Mohawk Valley. In the censuses of the following two years it has been reported in Quebec, is establishing itself as a winter bird in Ontario, and is increasing in Ohio. It looks very much as though the hitherto small numbers in the Great Lakes basin had already at this time evolved a wide swing along a northeast-southwest axis paralleling that extending from eastern Massachusetts to Virginia.—J. T. NICHOLS, *New York, N. Y.*

Sycamore Warbler in Massachusetts.—On April 22, 1936, the senior author accompanied by Mrs. Tousey found a 'Yellow-throated' Warbler in Mt. Auburn, Cambridge, Mass., which was shown to other observers. It was an adult male in full song. Griscom, advised by 'phone, went over in the afternoon, and felt positive that the bird was a Sycamore Warbler (*Dendroica dominica albilora*), as there was no yellow between the bill and the eye. The next morning the Harvard Ornithological Club located the bird and showed it to numerous other observers, who arrived later.

Griscom returned at 10 a.m. with Mr. Francis H. Allen, having secured special permission from the owners of the property to collect it. It was found after a two-hour search, promptly shot, and presented to the Boston Society of Natural History, where it is now mounted and on exhibition.

This bird is new to the State, and emphasizes a most unexpected condition of affairs. Forbush gives several sight records of 'Yellow-throated' Warblers for Massachusetts, but in no case is there any evidence that the subspecies was competently identified or that the attempt was made. Indeed, the assumption that such stragglers would be the southeastern rather than the Mississippi Valley race would almost seem justified as a matter of common sense. Nevertheless the facts are that the two specimens in existence from New England are Sycamore Warblers (cf. the Connecticut record in Forbush)! There is consequently no definite record of the Yellow-throated Warbler for Massachusetts, and we have here an ideal example of the advantage of collecting an accidental straggler, and the disadvantage attached to sight records, no matter how honestly and conscientiously made.—RICHARD H. TOUSEY AND LUDLOW GRISCOM, *Cambridge, Mass.*

Yellow-headed Blackbird at Monomoy, Massachusetts.—On Sunday, August 30, 1936, a large party explored Monomoy, hoping for a shore-bird flight after the violent east and southeasterly gale of the preceding day. Present besides the writer were J. A. Hagar, the State Ornithologist, Oliver K. Scott, John P. Bishop, David L. Garrison, Mr. and Mrs. Richard C. Curtis, Mrs. Malcolm MacLay and Mrs. Fuller. Across a certain sand flat the water's edge was obscured by some patches of tall *Spartina* grass, and dodging in and out were a small flock of sandpipers, which we were studying, hoping to find an unusual species. The incident is of interest psychologically, as we were 'shore-bird minded.' All but Mr. Garrison, therefore, overlooked a pile of straw topped by a piece of driftwood on the flat half-way to the water's edge. Sitting on top of the driftwood, in plain sight and close range, was an adult female Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*), just beginning to moult! It was rather tame and approached still closer, so that everyone had a perfect observation of a striking and conspicuously colored bird. According to Forbush, three specimens have been collected in this State, and there is another unquestionable sight record. The date of our observation is quite reasonable, since New England occurrences run from July to mid-October.—LUDLOW GRISCOM, *Museum of Comparative Zoölogy, Cambridge, Mass.*

Dickcissel at Ipswich, Massachusetts.—On January 5, 1936, a Dickcissel (*Spiza americana*) appeared at the feeding-boards of Mr. and Mrs. J. Frank Dubois, in Ipswich, Massachusetts, with House Sparrows, and was a daily visitor there until April 19. The Massachusetts Audubon Society was notified of the strange visitor, and at the suggestion of Mr. Francis H. Allen, the writer visited Ipswich on January 26 and identified the bird. This was confirmed the following day by Messrs. Ludlow Griscom and S. Gilbert Emilio. In Nuttall's time, a century ago, the Dickcissel was a rare visitor and for the last fifty years has practically passed out of the record east of the Allegheny Mountains. The Ipswich bird proved a popular attraction, for during the period that it remained, 275 visitors from Massachusetts and points at greater distances, registered in Mrs. Dubois's guest book.—GEORGE BAKER LONG, *11 Beacon St., Boston, Mass.*

RECENT LITERATURE

Hellmayr's 'Catalogue of Birds of the Americas.'—Dr. Hellmayr continues to produce his volumes with gratifying rapidity, and if both he and the Field Museum Press keep up the present rate of production we may all look forward to the completion of this series of standard catalogues within a reasonable time. The present volume¹ contains but two families, the Tersinidae (swallow-tanagers), monotypic with but three forms, and the Thraupidae (tanagers) with sixty-two genera. Compared with the hitherto most recent revisions of the tanagers,—those by Sharpe in 1909 and Berlepsch in 1910,—some interesting comparisons are possible. Sharpe followed Ridgway in removing *Atlapietes*, *Pselliophorus*, *Buarremon*, *Pezopetes*, *Lysiturus*, *Arremon*, *Pogonospiza*, *Lamprospiza*, *Saltator*, *Pitylus*, *Caryothraustes* and *Rhodothraupis* to the Fringillidae; Berlepsch still considered them tanagrine, while Hellmayr excludes them from the tanagers though admitting that the last word on their systematic position has not been said. Sharpe admitted *Iridophanes*, *Pseudodacnis* and *Calyptophilus*; Berlepsch excluded all three but did not endeavor to assign them elsewhere. Hellmayr admits *Calyptophilus* and provisionally retains *Pseudodacnis*; *Iridophanes* is now admitted to belong in the Coerebidae. If we exclude from further consideration the genera now placed in the Fringillidae but add *Calyptophilus* and *Pseudodacnis* to Berlepsch's list, we find that Sharpe listed 59 genera and 417 forms, Berlepsch 58 genera and 457 forms and Hellmayr 62 genera and 523 forms. The increase of four genera is due to three generic 'splits' of previously known forms, but only a single new discovery, *Tephrophilus* Moore. In view of the large amount of work done in South America in the last twenty-five years this is worthy of comment as is also the fact that there is only a net increase of sixty-six recognized forms in the same period. As is to be expected, Dr. Hellmayr has broadened the species concept in a good many cases, reducing to subspecific status a number of forms hitherto accorded specific rank, a procedure that seems to be entirely justified and in keeping with ornithological progress. For instance all the forms of *Spindalis* are considered conspecific; the aggregation of forms hitherto grouped among two species, *Habia fuscicauda* and *Habia salvini*, are considered conspecific, and to these is added *Habia gutturalis*, which incidentally is the oldest name; the *Tangara larvata* group of Central America is joined to *Tangara nigrocincta* of northern South America east of the Andes.

In the introduction Dr. Hellmayr states: "The rejection of Brissonian genera, in consequence of a vote passed by the International Zoological Congress of Padua entails only one nomenclatorial change: namely, the substitution of *Calospiza* for *Tangara*." Dr. Hellmayr, however, is mistaken in the action of the Padua Congress. It is true that a resolution calling for the rejection of generic names of binary authors was passed by that body, but this resolution was not then effective and was tabled at the Lisbon Congress, hence Brissonian generic names are still valid. But even if they were not, *Calospiza* G. R. Gray, 1840, is not the first available name to replace

¹ Catalogue of Birds of the Americas | and the Adjacent Islands | in | Field Museum of Natural History | including all species and subspecies known to occur in North America, | Central America, South America, the West Indies, and | Islands of the Caribbean Sea, the Galapagos Archipelago, | and other islands which may be included on | account of their faunal affinities. | By | Charles E. Hellmayr | Associate Curator of Birds | Part IX | Tersinidae-Thraupidae | Wilfred H. Osgood | Curator, Department of Zoology | Editor | Field Museum of Natural History Publication 365, zool. series, vol. 13, pp. i-vi + 1-458, Chicago, Oct. 6, 1936.

Tangara Brisson, 1760, for *Calliste* Boie, 1826, has the same type as *Calospiza* and is not preoccupied by *Callista* Poli, 1791 (Mollusca), under the International Code.

Four new names are proposed as follows: *Tangara imilans* (p. 63) vice *Euphonia gracilis* of authors, not of Cabanis; *Ramphocelus dimidiatus pallidirostris* (p. 256) vice *R. d. albirostris* Griscom, not *Tangara albirostris* Boddaert; *Habia rubica bahiae* (Bahia) (p. 301) and *Neothraupis* (p. 432), to replace *Diucopsis* Bonaparte not applicable.—J. L. P.

Mendall's 'Home-Life and Economic Status of the Double-crested Cormorant.'—Aspiring young ornithologists who look with dismay when a subject of their interest is written up and who feel that there are no opportunities for making worth-while contributions on a subject that is already extensively studied, should take heart at Mendall's recent contribution.¹ In the main, the paper is patterned after Dr. Harrison F. Lewis's excellent study published in 1929 and contains much of the same data, although worthy additions are made. Lewis's work dealt with the entire field of the natural history of the Double-crested Cormorant and was based on observations made on a large number of colonies, while Mendall's field research was largely restricted to a home-life study, made during the summers of 1933, 1934, and 1935, of a single breeding colony on Marblehead Island, in West Penobscot Bay, on the coast of Maine. Lewis and others are quoted extensively in the treatment of systematics, distribution, migration, courtship, and activities of the birds during the breeding season. In general a good summary of current published data on these subjects is given although it would seem that additional information on distribution and migration could have been obtained from the U. S. Biological Survey. Some new data are presented on the nocturnal habits and on the courtship of the bird, particularly those referring to water activities. It was also shown that courtship performances often persist to a degree after nesting duties have ceased. Mendall concludes that the young are dependent on their parents for food long after the ability to fly is acquired. Important information on the rate of growth of developing young is offered along with a careful description of the nest life of the young and of their parents.

Besides summarizing published accounts of the food of the cormorant, the present paper gives original information based on a laboratory analysis of more than 500 regurgitated meals. It is shown that along the coast of Maine, cunners, sculpins, and gunnels, all usually classed as worthless fishes of but little economic importance, constitute the major food items, averaging 42.20, 25.93, and 12.93 per cent, respectively, of the total consumption, while commercial or other valuable fishes, including flounders, herring, and eel, comprised 9.86, 3.73, and 2.74 per cent, respectively, of the total. On inland fresh-water lakes catfish, sunfish, and bass comprised 14, 11, and 3 per cent, respectively.

We can all share the author's feeling that the cormorant is an interesting, and perhaps usually a reputable, avian citizen well worthy of protection, yet in the face of the above figures we have difficulty in following him when he concludes that as a whole it "does little if any damage to man's interests." It would seem far better, and certainly more scientific, to admit, as he does in other parts of the paper, that limited and at least local depredations sometimes occur. The bird's esthetic and recreational worth fully justifies protection. The paper as a whole is a splendid contribution, yet prejudice or preconceived convictions seem to enter in a few in-

¹ Mendall, Howard L. The Home-life and Economic Status of the Double-crested Cormorant, *Phalacrocorax auritus auritus* (Lesson). The Maine Bulletin, vol. 39, pp. 1-159, 6 tables, 20 illus., October 1936 (University of Maine Studies, second series, no. 38, Orono, Maine).

stances, as when he refers to the superabundant Herring Gulls as "white thieves." It is well to remember that with most birds their economic status is more a result of abundance than of significant differences in food habits. If there were a reversal of the numerical strength of the cormorants and the gulls along the coast of Maine, it is quite probable that there would also be a reversal in the present economic relationships of the two species. When a species is overabundant, it draws attention to itself, and prejudice nearly always is in evidence. This condition of prejudice and condemnation is at present all too evident in the concentrated wintering area of coastal North Carolina, where the cormorants often cause annoyance and loss to gill- or pound-net fishermen.

As the author undoubtedly meant to extend full credit to all persons and organizations who aided him in furthering his researches, it would seem an oversight that no acknowledgment is made for the use of the data so frequently quoted from the files or reports in the Biological Survey, although credit is given to some of its members individually. Likewise, no acknowledgment is made of Mr. F. M. Uhler, although he is repeatedly quoted.—CLARENCE COTTAM.

Rand on Madagascar Birds.—This interesting work¹ is among the first efforts of one of the younger American, or perhaps we should say, Canadian ornithologists, for Mr. Rand was born and had his early education in Wolfville, Nova Scotia. Later he studied under Dr. A. A. Allen, at the Graduate School of Cornell University, leaving there before his course was completed to go to Madagascar.

This summary of his notes comprises the result of two years of observation and collecting on the 'great island.' It is, of course, a good deal more of an accomplishment than the modest "summary of field notes" implies. Besides a short preface by Monsieur Jean Delacour, leader, and an introduction with the usual acknowledgments, there is a section outlining the field work of the varied personnel, with a map to show the routes travelled. This section is necessarily complicated for at one time or another there were nine men collecting zoological, palaeontological and botanical specimens under the auspices of the expedition and these men never were all together, but, wisely enough we think, went alone to collect their specialties in the localities that seemed best. Rand has arranged information about these matters into sections with a running description of the country traversed and the collecting stations. These paragraphs are admirably restrained; it is easy to imagine the temptation to flights of descriptive prose and personal anecdote. But at the same time it makes one wish that more space had been allowed for the great, dark trees with the small red flowers where parrots fed, the tortured *Pandanus* and bizarre *Dideiria*, the strange popping and shrieks of the night in those jungles. It will be seen from this section that the island was covered very thoroughly and that the only locality of any importance that was omitted, is the forest of Sianaka from which came the great rarities, *Cochlothaustes*, *Heliodilus* and *Mesoenas unicolor*. Methods of travel, of which there is little mention, are probably very difficult in the country north of the capital and it is likely that porters (light loads are carried fast there) were expensive.

The following sections deal with the topography of Madagascar, the climate, distribution of forested areas, and the faunal regions or districts, with adequate maps. The author, basing his findings solely upon the avifauna, divides the island into three provinces: the oriental, with three districts or subprovinces; the occidental,

¹ Rand, A(ustin) L(oomer). The distribution and habits of Madagascar birds. Summary of the field notes of the Mission Zoologique Franco-Anglo-Américain à Madagascar. Bull. Amer. Mus. Nat. Hist., vol. 72, art. 5, pp. 143-499, 48 text-figs., Dec. 30, 1936.

with two districts; and the subdesert. In this the author says, "Our study of the bird life . . . largely bears out Humbert's divisions based on plant distribution, though it gives different extents and values to some of them." Grandidier (1879) recognized a central province which Rand does not, for, he says, ". . . the differences between the central and eastern provinces are those due to habitat . . ." It appears then that there are no great changes to be made in our notions of the faunal areas as outlined by Perrier de la Bathie (1921), and Humbert (1927), though Rand divides the central province among subprovinces or districts in either the eastern or western provinces. These provinces are thoroughly discussed in the following pages; the distribution of peculiar Mascarene genera within them is considered and the affinities, migrations and breeding seasons are expounded.

Considering the affinities of the birds, Rand agrees rather with later authors who hold that Madagascar and the Comoros should be considered as a region rather than a subregion of the Ethiopian region. He lists nine families and thirty-six genera which are peculiar to Madagascar and eight families of the Ethiopian region which do not occur on the islands in support of this view. Furthermore, he finds the greater part of the avifauna "so distinct that at the present time it is impossible to say whether it is more closely allied to the Indian or the oriental region." He lists only four genera that occur in the Indian and Malagasy regions but not in Africa. These are *Amaurornis*, *Ninox*, *Collocalia*, *Copsychus*. He mentions, however, that *Ixocincla* is very close to the Asiatic *Microscelis* and that certain species have definitely Asiatic affinities. In summarizing he says: "The African element, consisting largely of open ground and marsh birds could have arrived without a closer land connection. The Asiatic affinities seem to indicate a closer land connection, probably by a series of islands. . . . A land bridge undoubtedly existed by which some of the older endemic birds arrived, but evolved in Madagascar until now they do not indicate their origin." From this it will appear that, as one might expect, no conclusion as to the origin of the avifauna of the island can safely be reached on the evidence of the avifauna alone and older theories of an ancient African or Afro-European origin remain unchallenged.

Of migration it is observed that five species nest in Madagascar and spend the austral winter in Africa. No evidence was found of the migration of any species on the island (with the possible exception of Flamingoes) but "there may be local changes in the abundance of various species within limited areas."

Anyone who has made such a trip will realize how difficult it is to secure and prepare his quota of skins and at the same time obtain valuable life-history data. Rand finds that in general the breeding season corresponds with the rainy season but that a few birds breed throughout the year.

The latter half of the work deals with the birds in detail, their behavior, habitat and habits, as noted by members of the expedition and others. Most of the work is original. There are only a few taxonomic notes since, as the author observes, Delacour (1931-32) and others have published upon the collections. The rejection of the majority of Finn Solomonsen's subspecies is to be applauded for these are based on unstable and insufficient characters. We feel that the retention of what has been called *Canirallus kioloides* in that genus is, however, a mistake.

It fell to the lot of the author to observe some of the great rarities. His notes on *Monias*, an astonishing bird, are absorbing. To read them is to be transported to the time when the Dodo and *Aepyornis* still lived. Both species of *Mesoenas* were secured, though only the rarer *M. variegata* was seen and there are fascinating notes on the Couas. Curiously enough it was the botanist, M. Decary, who secured *Anas*

bernieri, the rare little teal; *Eutriorchis* was found to have lunched on a huge chameleon; *Dromoeocercus seebohmi* and *Sarothura watersi*, both names to make collectors shiver, were discovered in extremely localized areas in the mountains and are considered to be the only truly mountain forms.

Unfortunately no botanical names are associated with the food habits or habitat of the birds. It seems a pity that M. Decary could not have been with the ornithological party for a time so that such notes might have been made, but give us an inch and we want a mile. Mr. Rand has done a very good piece of work.—J. C. GREENWAY.

Priest's 'Birds of Southern Rhodesia.'—This¹ is the fourth volume, concluding the general account of the birds of Southern Rhodesia, of which the three other volumes have already been noticed in 'The Auk.' It treats of the remaining groups of Passeriformes, including fifteen families: cuckoo-shrikes, drongos, helmet-shrikes, shrikes, tits, orioles, ravens and crows, starlings, white-eyes, sunbirds, sugarbirds, tree-creepers, weavers, fringilline sparrows, and buntings. An index to the volume includes both English and Latin names. The treatment is uniform with that of the other volumes, giving first the English and current Latin name, with citation of the original description and type locality, followed by paragraphs on Distribution in Africa and in Rhodesia, then Habits and General Notes, concluding with a careful description of each of the 134 species treated. The subject matter is well arranged under these heads, and includes brief accounts of the nesting habits, eggs, food, display, with quotations from various published sources. The effort to provide each species with a vernacular name will help to crystallize usage as well as to render the subject more intelligible to the layman. The volume contains much that is of general interest. While the avifauna of Rhodesia includes few types familiar to American ornithologists, there are three species of titmice, a tree-creeper (*Salpornis*) allied to *Certhia*, crows and a few sparrows recalling our House Sparrow. Two of the tits are parasitized by a honey-guide, while the common Pied Crow, which haunts the neighborhood of man, is parasitized by the Great Spotted Cuckoo. The Wattled Starling specializes on locusts as food, feeding its young on these pests and at other seasons pursuing their swarms in flocks. The interesting relations of the two oxpeckers with large game mammals are described. These birds clamber about on their hosts in search of ticks and by their sudden departure or sharp notes, give warning of the approach of danger. The white-eyes here as elsewhere, in their fondness for sweet juices, do a certain amount of damage to soft-skinned fruits. Some of the sunbirds are found to puncture the corollas of large flowers to secure nectar at the base, but apparently never drink water. The many weaverbirds, in which a wide variety of habits obtains, are of special interest. The polygamous species such as the Red-headed Weaver (*Anaplectes*) and the Red Bishop (*Pyromelana*) stand in contrast to those that live in solitary pairs. In *Pyromelana* it is stated that female nestlings outnumber the males in significant proportion, a fact that seems correlated with polygamous habits. The striking way in which noisy colonial weavers (*Hyphantornis*) suddenly cease their racket altogether for a brief period is recalled. An interesting type of nest is described for *Plocepasser*, consisting of a rough tunnel of grass built in a thorn bush, and then the nest-end blocked up. The display flights of *Coliuspasser* and *Pyromelana* are described. The Pin-tailed Wydah (*Vidua macrura*) is definitely shown to be parasitic on its relative the waxbill, but the young bird on hatching does not eject the rightful young as do the cuckoos and others, although

¹ Priest, Capt. Cecil. The Birds of Southern Rhodesia, vol. 4. 8vo, London and Beccles, ix + 420 pp., 10 color plates, 122 text-figs., 1936. Published by William Clowes & Sons, Ltd., 94 Jermyn St., London, S. W. 1.

the parasitic parent may remove one or two eggs of its host on laying. These and many other interesting facts make the work valuable to the general reader. It is, in fact, a handbook, providing ready means of identifying the many Rhodesian species of birds, besides summing up the pioneer work in regard to their habits. It thus clears the way for much more detailed and critical studies of individual species which must next be undertaken. The ten color plates are by Grönvold while the many text-figures in black and white by N. Lighton illustrate most of the species satisfactorily with often a bit of the characteristic haunts as background. The author promises a fifth volume as an appendix, to include the more important notes that have been published since the inception of the work, as well as a general index.—G. M. A.

William Brewster's 'October Farm.'—In this modest little volume¹ lives again the spirit of William Brewster. Those of us who knew him,—even though slightly,—can never forget his charming presence, his delight in living things, his sensitiveness to all that went on about him. Blest with abundant leisure, he devoted his life to the close observation, particularly, of birds, finding the keenest pleasure in their companionship. From young manhood it was his habit to keep a journal in which he wrote full descriptive accounts of what he saw in his excursions afield. The many volumes of these manuscripts, which he bequeathed to the Museum of Comparative Zoölogy, form a treasurehouse of natural-history notes, from which his friend and frequent companion, the late Smith Owen Dexter, has here brought together numerous incidents relating to the birds, mammals, and reptiles of the Concord region. October Farm was the name Brewster bestowed upon his stretch of land bordering the Concord River, where stood the fine old farmhouse, with its gardens, orchard and adjacent woodlands to which during many years he was wont to repair from spring till autumn. Here he followed the progress of the annual migrations, observed the intimate habits of the nesting birds, watched the muskrats, foxes, and turtles, or listened to the mysterious sounds of night. Nothing was too trivial to arouse his interest; his quick eye and keen ear found something unusual at every turn.

As a writer, Brewster had the rare faculty of presenting in few words an entire situation. He excelled in clear and beautiful diction and in vivid and intimate description. The selections from the journals are arranged in chronological order from April, 1872, to the last day in Concord, May 14, 1919. They include a wide range of subjects: the nesting and song of the Woodcock; rare glimpses of Pied-billed Grebes; how a shrike hunts its prey; the songs of Lincoln's Sparrow; spring music; the display of the Ruby-throated Hummingbird; thoughts on migration; drumming of snipe and of grouse; night calls of the Veery; experiences with owls; the Blue Jay's destruction of birds' eggs; a remarkable friendship between a goose and a guinea-hen, both hatched by a foster-parent hen; the doings of foxes, skunks and turtles. All these tell interesting bits of the lives of these wild creatures at Concord. The volume is one that should be in the hands of every field naturalist, not only as an inspiration to accurate observation but also as a pattern in the art of describing in clear and readable fashion what he has seen in the field. One or two misspelled names of animals are excusable for the editor died ere the publication of the book, but the lack of an index is unfortunate. Quite apart from its value as a work on natural history, the literary charm of these extracts makes the book worthy of high place. It should stand on one's library shelf beside Thoreau's 'Journals' as another Concord classic.—G. M. A.

¹ October Farm | from the Concord Journals | and Diaries of | William Brewster | with an introduction by | Daniel Chester French. Harvard University Press, Cambridge, Mass., small 8vo, xv + 285 pp., 4 half-tone plates. Price \$2.50.

PERIODICAL LITERATURE

- BELCHER, CHARLES F. Nota sobre la agachona, *Thinocorys rumicivorus*. El Hornero, 6: 313-314, 8 text-figs., July 1936.—The author, after various futile attempts to locate the nest of a Seedsnipe he had repeatedly flushed in the open country of Pilcaniyeu, Rio Negro, Argentina, at length found it after flushing the bird within a yard distance. He found that the bird had partly buried the four eggs with loose earth and a few straws, probably, he supposes, when it saw him near at hand, so that only the small ends of the eggs were visible on very close scrutiny of the spot. The four speckled eggs are shown in the figure, of natural size.
- CAMPBELL, JAMES W. On the food of some British birds. British Birds, 30: 209-218, 1 Dec. 1936.—An analysis of contents of crop and gizzard in fourteen species. Volume of food was determined by its water displacement in a graduated glass. Rooks and Jackdaws show a similar diet, with about 85 per cent of vegetable matter, largely grains, the animal matter chiefly insects. In the case of the Common Jay, the importance of the oak as a source of food is emphasized. Acorns in the birds examined constitute half the vegetable content of stomachs, while the larvae, pupae and ova of insects included, are chiefly those living in oak trees. The winter food of fourteen Barnacle Geese was entirely vegetable matter, consisting of over ninety per cent green grass, in addition to leaves, horsetail rush, moss, liverwort and seeds. By contrast, the stomachs of Eastern Brant in the same period held mostly the marine green alga, *Enteromorpha*, with smaller amounts of eel-grass, *Zostera*, the latter probably unobtainable at present in quantity, so that the former may be an acceptable substitute. The Ringed Plover and Golden Plover feed largely on animal matter, chiefly insects and small snails. Snipe and Woodcock in fall and winter consume much insect larvae as well as seeds and other vegetable matter. Both the Common Snipe and the Woodcock were found to have remains of earthworms in their stomachs, whereas the Jack Snipe had none, but had eaten snails (*Succinea*) instead. Pheasant chicks from six to fourteen days old fed almost exclusively on insects, with a trace of snails. The species of insects given include full-grown larvae of the burnet moths which are supposedly examples of warning coloration and distasteful to birds. The Common Partridge and the Red-legged Partridge agree in being almost wholly vegetarian although a few insects are also taken.
- CAMPO, E. MUNOZ DEL. Observaciones sobre rapaces nocturnas en cautividad. El Hornero, 6: 306-310, 2 text-figs., July 1936.—Brief notes on food suitable for captive hawks and owls, the favorite being rodents. Captive Burrowing Owls were watched while at work excavating their burrow. They clear away the earth with their feet, like a small dog, scattering it to a distance. All four captive birds collaborated, digging it to a depth of two meters.
- CHAPIN, JAMES P. A new Peacock-like bird from the Belgian Congo. Rev. Zool. et Bot. Africaines, 29: 1-6, text-fig. 1-3, 20 Nov. 1936.—The discovery of this remarkable bird, which Dr. Chapin describes as a new genus and species, *Afropavo congensis*, is as unexpected and surprising as was that of the okapi. Its existence was not suspected until, in 1913, Dr. Chapin rescued a feather from a native's hat at Avakubi, Belgian Congo, that was evidently a secondary from some large bird, of unknown identity. In 1936, while visiting the Congo Museum at Tervueren, Belgium, he noticed two birds mounted and placed in an obscure corner, that had been received in 1914 from the small museum of the Compagnie de Kasai, Brussels. They had been labelled 'Peacocks' and had been set aside without further investigation. These birds proved to be of the same species as that represented by

the problematical secondary, a true pheasant, related to the Asiatic Peacock, and providing "one more example of an African forest bird with suggestive affinities to an Oriental group." Shortly after this discovery, M. de Mathelin de Papiguy independently told Dr. Chapin of a similar bird, which he had eaten, killed by a native in the eastern Congo Forest at Angunu! The species is evidently of restricted range and secretive habits to have so long escaped the notice of explorers. It has no long peacock-like train but the head and neck are covered with short downy feathers, surmounted by an occipital crest in the shape of a tuft of narrow, slightly diffuse plumes. One of the specimens is an adult male with a spur, the other perhaps a female or an immature male. The second metacarpal shows the small protuberance distinguishing the Phasianidae from the Numididae.

CORTI, ULRICH A. Vogelschutz und Kulturlandschaft. Der Ornith. Beobachter, L'Ornithologiste, 33: 208-211, Sep. 1936.—Advocates more careful research of Swiss birds as to their food habits, before a given species is adjudged harmful or beneficial. Since censuses of fruit trees and areas of field crops are available in Switzerland, if the average effect of a single bird is determined the total effect of the species on certain crops can be estimated. Thus, if from one to five apples are regarded as saved by the insectivorous birds per tree, the total for Switzerland would amount to from 150 to 750 tons of apples yearly. Similarly, a rough calculation of the harm done by cherry eaters, assuming so many cherries are eaten per bird, shows a total loss of 675 tons of cherries, a loss to be figured against the good the birds do in other ways. Exact studies of this sort are urged.

DAGUERRE, JUAN B. Sobre nidificación de aves de la Prov. de Buenos Aires. El Hornero, 6: 280-288, 4 text-figs., July 1936.—Instances cases where the social parrot, *Myiopsitta monacha*, which makes large multiple nests, abandoned these nests in the lower branches of trees when persecuted by man, and started new compound nests in the higher limbs of eucalyptus trees. Another parrot, *Cyanolyseus patagonus*, which nests in holes in banks, was formerly abundant in the littoral region of Buenos Aires Province, but due to human persecution in taking the young birds, easily accomplished by thrusting a pole with a noose or a hook at the end into the burrow, the bird is now completely exterminated in all this region, and is rare in Santa Fé Province. Both species and two others are now decreed pests! In marshy regions, the Southern Everglade Kite (*Rostrhamus sociabilis*) makes its nest in reed beds, constructing it out of the stalks of reeds and other vegetation. Notes are given on the nesting habits of various species of Argentine birds.

DEAKIN, ALAN. Natural hybridization and genetics of Flickers (*Colaptes*). Amer. Naturalist, 70: 585-590, 1936.—From a study of the series of Flickers in the National Museum at Ottawa, and especially of two families together consisting of four parent birds and their nine young, in which both pairs of parents were hybrid between the Yellow-shafted and the Red-shafted Flickers, the author attempts an analysis of the genetic characters involved, whereby the various degrees of intermediate plumage may be expressed as combinations of dominant and recessive traits. This theoretical explanation should some day be tested by rearing the young of known hybrid parents.

DROST, RUDOLF. Ueber das Brutkleid männlicher Trauerfliegenfänger, *Muscicapa hypoleuca*. Der Vogelzug, 7: 179-186, 2 text-figs., Oct. 1936.—A comparison of 237 skins of breeding males of the Pied Flycatcher from northern and central Europe shows that in color they may be ranged in a continuous series, from those with a uniformly black upper side, occurring in Scandinavia, to those which are

- brown or gray above, and occur in middle Europe. These differences the author believes are of systematic importance but he assigns them no names.
- DUPOND, CH. Oeuvre du baguage des oiseaux en Belgique. *Le Gerfaut*, **26**: 69-125, 1936.—The progress of birdbanding in Belgium is outlined, with increasing numbers of returns, amounting to 500 in 1934, 628 in 1935. Details are given for 572 of the latter, covering 64 species, as well as for five species banded outside of Belgium. Brief comment is added as to the interpretation of these returns. It is shown that the Bullfinches nesting at high altitudes in the mountains, descend to the lowlands to winter.
- DUPONT, PAUL. Moeurs de Petits Coqs de Bruyère. *Le Gerfaut*, **26**: 139-142, 1936.—In eastern Holland several small groups of *Lyrurus* were at various times observed feeding near a station for testing explosives. They showed great regularity in their times of arrival at a feeding area and were extraordinarily unmindful of the frequent loud detonations produced in the experiments.
- GABRIELSON, IRA N. Bird notes from the Lake Francis region of southern Minnesota. *Wilson Bull.*, **48**: 305-309, Dec. 1936.—A briefly annotated list of sixty-three species seen in mid-summer. Of birds that lend a more western aspect to the otherwise eastern species, are Western Meadowlark, Dickcissel, Yellow-headed Blackbird. Bob-white were abundant.
- GÉROUDET, P. Les mouettes rieuses de Suisse, d'après les résultats du baguage. II. partie. Les hôtes d'hiver et de passage en Suisse. *Der Ornith. Beobachter, L'Ornithologiste*, **33**: 167-177, 1936.—The Black-headed Gull (*Larus ridibundus*) as a winter resident and migrant in Switzerland has been intensively studied for a period of years by means of banding. It is believed that those which merely migrate through, may on passage stop for a time with birds that winter in Switzerland. Comparatively few of the birds banded in southern Germany, pass the winter in Switzerland. In summer, flocks of first-year young are found accompanying adult non-breeding birds, in places where they are not nesting. The birds that reach Switzerland in southward migration, follow the Rhine as a main flyway, bringing in birds from the North Sea coast. The Danube also acts as a directive for birds from Czechoslovakia, Hungary and Silesia. Migration may take place at night. A large proportion of these gulls returns each winter to the same stations they individually occupied in preceding winters, but there are many others that do not, and have been retaken in subsequent winters elsewhere. Winter-resident birds remain in the same locality from October to March, with however, a certain amount of drift away to the southwest. In general, birds in their second summer do not breed. Longevity records for wild banded birds are now available of from six to ten years (one case).
- GEYR VON SCHWEPFENBURG, H. Wie ziehen die holländischen Jungstörche? *Der Vogelzug*, **7**: 187-190, Oct. 1936.—Haverschmidt's study of the migration of White Storks of Holland, led him to disbelieve in the previously accepted view that they reach Africa by two routes, birds east of the Weser skirting the east end of the Mediterranean, while those west of it pass south by way of the Straits of Gibraltar. The present author shows that his results in banding Dutch storks may be otherwise interpreted, to the effect that the birds of northern Holland in general take the southeastern route, while those of southern Holland use the western.
- GILL, GEOFFROY. Further notes on the constancy of Catbirds to mates and to territory. *Wilson Bull.*, **48**: 303-305, Dec. 1936.—A male bird, previously reported upon, now is found at the close of the third season, to have been constant to the

same 'territory' for two seasons and for four nestings out of five, but had mated with a different female in each nesting. In the two following years he remained mated to the same female.

HARPER, EDUARDO C., AND DRABBLE, LIONEL. Sobre la nidificación de los Flamencos (*Phoenicopterus ruber chilensis* Mol.). El Hornero, 6: 249-253, 7 text-figs., July 1936.—An account of observations on a large nesting colony of Chilean Flamingoes found on an island in a lake in Santa Fé Province, Argentina. Nests are placed near together in a single colony, the exact site of which varies from year to year, but is always on the north side of the island. Nesting begins about the 15th to 20th of January, in the warmest part of the year. The authors conclude that the sun's heat is the major factor in hatching the eggs, for the birds were not seen to incubate by day. After several days the eggs become much smeared with mud. Such eggs are hot to the touch, while those not inuded are cold. The colony was estimated to contain some ten thousand nests, while the number of adult birds was larger, probably exceeding fifty thousand. In several cases, a nest with two eggs was found.

HARPER, FRANCIS. The distribution of the Limpkin and its staple food, *Pomacea*. The Nautilus, 50: 37-40, 2 text-figs., Oct. 1936.—The normal range of the Limpkin coincides with the distribution of the large freshwater snail, *Pomacea paludosa*, upon which it primarily depends for food, at least in Florida, and in southern Georgia to the lower Altamaha River. Two records of the Limpkin from South Carolina and Harper's record of it from the Okefinokee Swamp, Georgia, are doubtless of accidental wanderers. The nocturnal activity of the bird may be a result of the activity of the snail which at night comes into the shallows or even out of the water.

HARTERT, E., PALUDAN, K., LORD ROTHSCHILD, AND STRESEMANN, E. Die Vögel des Weyland-gebirges und seines Vorlandes. Mitteil. a. d. Zool. Mus. Berlin, 21: 165-240, map, 19 text-figs., Aug. 1936.—A report based on a collection of some 1300 skins collected by Georg Stein in the Weyland Mountains of New Guinea, and their foothills. A brief history of ornithological work done in this region is given, especially that of Stein, followed by a list, with brief comment, of 245 native species and eight migrants obtained. Zoogeographically, the avifauna of New Guinea may be divided into an upland and a lowland group. In western New Guinea the upland series forms more or less of a unit, characteristic of levels mainly above 3000 meters, extending along the central backbone of the island from the Weyland Mountains near the west end, eastward to at least the Orange Mts. (Mt. Goliath), while still farther to the eastward, some other forms come in. Also the slopes falling off to the Sepik River have certain peculiar forms. Still farther eastward comes a long stretch, the Bismark Range, as yet almost unknown ornithologically, while beyond on the high mountains of southeastern New Guinea a number of upland species abruptly drop out and others appear. At the west end of the island, Mt. Arfak is peculiar in having a number of endemic mountain forms, for this area is cut off by a wide stretch of lowlands, which acts as a barrier. The lowland fauna is quite distinct, for while the high mountains serve to give continuity to the ornithology of the uplands, they act as a barrier to that of the lowlands, since practically all of the passes are above 2000 meters, and usually higher. Thus the central backbone of high ranges divides the New Guinea lowlands into a northern and a southern coastal area. This great barrier begins at the west end near the isthmus separating Geelvink and Triton Bays and extends continuously to the extreme southeast end of the island, a distance of over 1125 miles. Here

and there in the latter region, the steep mountain ranges come very close to the sea, narrowing the lowlands to a coastwise strip or to nothing at all. The result is that the lowland avifauna north of the central watershed has many characteristic groups of birds different from their nearest relatives of the southern side. These two faunas mingle to some extent at the extreme west end of the island where the mountains descend at the region of Geelvink Bay. The distinctness of the birds of the opposite sides is illustrated by the distribution of a number of related groups plotted on eighteen small maps of the island. Often these are represented by other forms west of Geelvink Bay, in the western lobe of New Guinea. It is in the southern lowland area that the species of Australian affinity occur. Where species have succeeded in getting around the western end of the mountain barrier, related forms may remain distinct if they occupy different ecological niches or they may hybridize in a limited contact area. Significant of the thoroughness with which western New Guinea is now known, is the fact that no new species are described, although eight new races are named. Two new monotypic genera are proposed: *Rhagologus* (p. 206) for a shrike, *Pachycephala leucostigma*; and *Androphobus* (p. 220) for a timaliid, *Androphilus viridis*.

HICKS, LAWRENCE E., AND DAMBACH, CHARLES A. A statistical survey of the winter bird life of southeastern Ohio—Muskingum County. *Wilson Bull.*, 48: 273-275, Dec. 1936.—In the course of continuous field observation from December 15, 1934 to February 15, 1935, sixty-five species of birds were seen in this hill country, and a record of numbers of each is given. A daily average of 2468 birds was enumerated of which nearly 2000 were Crows or Starlings. Northern visitors were conspicuously absent. The hordes of Starlings evidently make a decided drain upon the available food. Many raptorial birds are attracted nightly to their roosting place as they gather for the night.

KENNARD, FREDERIC H. John Marion Priour. *Wilson Bull.*, 48: 284-289, text-fig. 48, Dec. 1936.—A brief biography of this veteran hunter and collector of Corpus Christi, Texas. He was born in Rennes, France, in 1812, and came to this country in 1831. It seems to have been his chance meeting with Colonel N. S. Goss that aroused a latent interest in birds and collecting. In later years he devoted himself largely to hunting and collecting birds, but from a commercial point of interest. His fine qualities as a companion and outdoor man endeared him to many ornithologists who from time to time camped and collected with him.

KHAKHLOFF, V.-A. Les oiseaux de la Steppe de Kouznetzki et du Salair. *Le Gerfaut*, 26: 126-137, pl. 1-4, 1936.—This is the first part of a translation of an article in Russian on the avifauna of a little-known steppe area in western Siberia, isolated by coniferous forests from the more extensive steppes to the eastward. The scant literature is reviewed and recent explorations in the area are outlined. Hitherto 141 species of birds have been recorded from the region.

KRÄTZIG, H., AND SCHÜZ, E. Ergebnis der Versetzung ostbaltischer Stäre ins Binnenland. *Der Vogelzug*, 7: 163-175, 3 maps, Oct. 1936.—Results of extensive banding of Starlings in eastern Germany, show that birds from Silesia commence migration in October, and spreading from west-southwest to south-southwest, go chiefly to upper Italy and the adjacent Mediterranean coast, thence across to northwestern Africa from Tunis and Algiers to Gibraltar. A few winter in northern Italy. Birds banded in Saxony are deflected westward by mountain ranges and for the most part go farther west through France and southern Spain to northwestern Africa. Many winter in the Garonne region, however.

As an experiment in transplanting, in the summer of 1934 over three thousand

Starlings captured in the region of Memel on the Baltic coast of Lithuania were brought to Breslau and to Dresden where they were banded and released in early autumn. Recoveries showed that some returned in the general direction of Lithuania (to the northeast), but most of them went west and southwest, to England, Belgium, and chiefly to France, northern Spain and Algiers. No recoveries were had from Italy. In the following spring some were retaken in their native Lithuania, but others were found in France and Germany. The evidence shows, however, that in general these transplanted birds tended to migrate south to the regions usually visited by the Lithuanian Starlings, and to return to their respective populations in spring. A detailed list of these recoveries and a map are given.

LASKEY, AMELIA R. Fall and winter behavior of Mockingbirds. *Wilson Bull.*, **48**: 241-255, Dec. 1936.—In Tennessee, where the behavior of Mockingbirds was studied, they show a marked preference for the neighborhood of human habitations. By following individuals that had been banded it was found that selection of territory takes place in the autumn beginning about October first. These territories are strictly guarded throughout autumn and winter, and partly depend on the presence of sufficient food. Birds holding adjacent territories are alert to drive away intruders, when one of their number by special notes gives warning of the approach of another stranger Mockingbird. Mock encounters ("dances") or actual fights take place at times on the territory borders between two established birds. The pairs of birds may remain together all winter; both sexes sing. Many notes on individual birds.

LAURI, SIIVONEN. Ein neuer Apparat zur Registrierung der Intensitätsvariation der Zugunruhe bei gekäfigten Zugvögeln. *Ornis Fennica*, **13**: 67-69, text-fig., July 1936.—Describes an ingenious device for recording the migration urge of a caged bird, through having a perch so pivoted that each time the bird alights upon it, a wire arm is moved, which, acting on a cog wheel, unwinds a given length of linen thread from a spool. The length of thread unwound gives the relative amount of the bird's nightly activity. An alarm clock is added, which by an electromagnet makes a mark at hourly intervals. A diagram of the arrangement is given.

LENTZ, DR. Vögel des Winters in Mallorca. *Der Ornith. Beobachter*, L'/Ornithologiste, **34**: 21-31, Nov. 1936.—A list of sixty-four resident and winter birds observed in southern Mallorca, Balearic Islands, with brief annotations on eight other birds of rare occurrence as stragglers or migrants. Of the resident species, a large proportion are represented by races peculiar to these islands. The author points out that there are no woodpeckers, tree-creepers, jays or rollers, while the Carrion Crow, the Hooded Crow and the Rook are also absent. The Flamingo, *Phoenicopterus r. antiquus*, still occurs as an occasional visitor, but no longer in flocks as a migrant.

MCCABE, T. T. Endemism and the American Northwest. *Wilson Bull.*, **48**: 289-302, text-fig. 49, Dec. 1936.—In British Columbia, there are practically no endemic species with the probable exception of the Northwestern Crow, which the author regards as specifically distinct from *Corvus brachyrhynchos*. The southern Alaskan coast offers a striking contrast; while in the number of what appear to be relict forms, western Alaska and its islands are remarkably rich. The bird population of the interior of British Columbia is large, and is the result of invasion from three contiguous areas: the Far North, the East, and the Rocky Mountain and Great Basin areas.

MEISE, WILHELM. Zur Systematik und Verbreitungsgeschichte der Haus- und

- Weidensperlinge, *Passer domesticus* (L.) und *hispaniolensis* (T.). Journ. f. Ornith., **84**: 631-672, 3 text-figs., Oct. 1936.—The Spanish Sparrow, with its reddish-brown instead of gray crown, black-streaked instead of gray back, and white instead of gray ear coverts, occupies a wide area in the Mediterranean basin, from Spain to Persia and in northern Africa. Over most of its range it occurs together with the House Sparrow, but in a different niche, inhabiting tree growth along streams. In eastern Algeria and western Tunis, however, it becomes a house-living commensal with man, and here hybridizes with the House Sparrow. Apparently, however, the relationships are not at all simple. In northern Italy the House Sparrow by insensible degrees intergrades with the peninsular bird, as a true geographic subspecies (*P. domesticus italiae*). This latter, however, over most of the southern part of Italy, in Corsica and Crete is very variable, and becomes increasingly more like the Spanish Sparrow to the south and in the opposite parts of Africa, a fact to be explained only on the hypothesis that here the two species have hybridized. The Italian Sparrow is thus a fairly constant hybrid species, at least over most of the Peninsula. Probably both parent species at one time inhabited areas at opposite ends of the Mediterranean, and later their ranges widely overlapped. Where the habits of the two remained different the species kept distinct, but where, as in northern Africa, the Spanish Sparrow became a house species as about oases, hybridization took place. The nomenclatural questions involved are discussed.
- MORLEY, L. C., AND WETMORE, P. W. The etiology of ulcerative enteritis in upland game birds. Science, n.s., **84**: 272-373, Sept. 18, 1936.—“Ulcerative enteritis, or so-called ‘quail disease,’ first came to the attention of sportsmen early in 1900 through the exceedingly heavy losses encountered in importations of Mexican quail.” It is highly infectious and rapidly fatal, with an incubation period of about four days. These authors for the first time have isolated the organism from the liver and spleen of diseased Bob-white, Valley Quail, and Ruffed Grouse, and have named it *Corynebacterium perdicum*. The morphology, cultural and physiological characters are described. The symptoms of the disease are sudden death with characteristic lentiform ulcers in the intestines. When grown on culture media most of the strains lose their virulence. Toxin production has not yet been shown.
- NICHOLSON, E. M. The index of Heron population, 1936. British Birds, **30**: 202-205, 1 Dec. 1936.—Beginning in 1928, a study made of the Common Heron in the British Isles has now been extended to cover more than 120 heronries. The population of Herons has now “satisfactorily recovered from the setback experienced between 1928 and 1934” in spite of an unfavorable season in 1935. The outstanding feature of this recovery is that while some heronries have shown a considerable loss in the year past, others have increased in the number of breeding birds, so that in the aggregate the breeding population for the area covered remains about the same. These violent fluctuations in separate areas or heronries seem characteristic for the species.
- NOLL, H. Beringungsergebnisse an unseren schweizerischen Lachmöven. I. Teil. Der Ornith. Beobachter, L’Ornithologiste, **33**: 159-167, map, 1936.—A study of the Black-headed Gulls that winter in Switzerland. Banded birds are found to move occasionally from one breeding area, as in the Linth plains, to another, as the Boden Lake. Their chief wintering area is the western Mediterranean basin, reached by way of the Gulf of Lyons and the Rhone valley, with a northern wintering limit at Genfer Lake. The second wintering area is the Atlantic coast of

Europe, as far north as England. A few birds seem to cross the Alps and winter at the mouth of the Po. First-year birds may remain in the following summer on the wintering range. The adults return with great regularity to their particular home ground, resulting in a clan formation, whereby birds from a particular colony hold together in their wintering area.

ORFILA, RICARDO N. Los Psittaciformes Argentinos [Argentine parrots]. *El Hornero*, 6: 197-225, pl. 2, 11 text-figs, July 1936.—The first part of a synopsis with keys to families, subfamilies and genera of Argentine parrots, with an account of the technical characters of these groups. The genera *Anodorhynchus*, *Ara*, *Aratinga*, *Thectocercus*, and *Eupsittula* are treated, with brief lists of synonyms and of specimens in the Argentine Museum of Natural Sciences. Outline drawings and photographs illustrate heads and characters of the bill, supplementing descriptions of each species.

PAECHNATZ, HERMANN. Aus dem Tageslauf überwinternder Schwanzmeisen (*Aegithalus c. caudatus*). *Der Vogelzug*, 7: 175-179, Oct. 1936.—The Long-tailed Tit is known to differ from other titmice in its habit of keeping in flocks of its own kind instead of associating in winter with other forest birds. The author followed the daily doings of a flock of nine of these tits throughout a winter. Of special interest are the sleeping habits. Nightly toward sunset they resorted to a certain twig about two meters from the ground. The first bird to seek the twig was soon followed by a second which perched close beside it. Shortly a third would come and push its way between the two others; the fourth, fifth and others in turn pushed in between two of the middle birds, until the original two finally perched at opposite ends of the line. The time of roosting varies in accordance with clear or cloudy sky; if clear they roost after sunset, but if cloudy, then before sunset. The day's wandering of the flock on December 27 as a typical example is plotted.

PALMGREN, PONTUS. Bemerkungen über die ökologische Bedeutung der biologischen Anatomie des Fusses bei einigen Kleinvogelarten. *Ornis Fennica*, 13: 53-58, 2 text-figs., 25 July 1936.—Experiments designed to find out whether certain small tree-living birds showed a distinct preference for perching on smooth leafy twigs or on the needle-covered twigs of spruce or fir. A twig of each was placed in a cage and by ingenious recording devices, the number of times the bird alighted on the twigs was recorded daily. Of seven species so studied, including Bullfinch, Goldfinch, Black-cap, Fieldfare, and Redbreast, the Fieldfare showed 42 per cent of choices for the fir twig, the Bullfinch 52 per cent, while the others chose the smooth twig almost exclusively. A correlation is shown between width of span and choice of perch, the short-toed birds obviously avoiding the fir twig, with its needles. A list of common birds arranged according to the increasing length of foot span shows a similar but not absolute correlation, for other factors come in. A list arranged in accordance with the relative length of hind toe to the total span of the foot, shows that it is greatest in birds such as tits and cross-bills that cling to twigs, often upside down.

PEREYRA, JOSÉ A. Importancia de nuestras aves. *El Hornero*, 6: 254-261, July 1936.—A general article on the value of birds in destroying insects injurious to agriculture as well as rodents which may become harmful as destroyers of crops or as disease bearers.

PHILIPPI, RODOLFO A. Aves de Arica y alrededores (extremo norte de Chile). *El Hornero*, 6: 225-239, 5 text-figs, July 1936.—A brief list of 55 species of birds seen in the neighborhood of Arica, in the extreme north of Chile. Arica is in the arid part of the sub-tropics, in a region with a characteristic desert fauna, similar

to that of the coast of Peru but very distinct from that of central Chile. Land birds are few in species: a wren, a titlark, a swallow, five sparrows, an oriole, three flycatchers, two wood-hewers, two hummingbirds, an ani, two owls, two hawks and three kinds of vultures are listed, in addition to seabirds. One of the hummingbirds, *Myrtis yarrellii*, is limited to this region. The House Sparrow is introduced. The Ani accompanies horses and cattle, alighting on their backs to secure ticks and fly larvae.

PUMFRET, D. G. Heron and cattle. *British Birds*, 30: 229, 1 Dec. 1936.—An interesting case of a Common Heron in Surrey, England, alighting among a grazing herd of cows, apparently to take advantage of their aid in discovering frogs disturbed by their passage. It would stand among them until the last cow had passed, when it would walk quickly on to overtake the herd. Four times the bird was seen to strike into the grass and secure a frog, with which it flew to an adjacent stream, there disposed of its prey and returned to continue its watch in the midst of the herd.

SCHNURRE, OTTO. Zum Vogelfang des Grossen Buntspechts. *Beiträge z. Fortpflanzungsbiol. d. Vögel*, 12: 232-234, Nov. 1936.—An instance of the Great Spotted Woodpecker (*Dendrocopus major*) preying on small birds is described, as seen in Grenzmark, Germany. While the author watched a newly flown family of tree creepers in a neighboring pine, a male woodpecker appeared, causing the group to become alarmed and to pursue it. Suddenly the woodpecker seized a creeper and flew off, with the others giving chase. It finally hung its prey in a fork and hammered it to pieces, eating first the brain then the stomach, disposing of the meal in ten minutes. A dozen or more instances are quoted from literature concerning the killing of young birds or eating of the eggs by this species.

SCHÜTZ, E. Ring-Wiederfunde auswärtiger Stationen 13. *Der Vogelzug*, 7: 191-197, 1 text-fig., Oct. 1936.—A summary of returns of birds banded at this Station. From banded birds, the following determinations of ages to which the species have lived are given: White Stork, nineteen years; Black Tern, seventeen years; Common Swift (*Apus apus*), at least fourteen years; *Apus melba*, in three cases ten years; Puffin, eight years; Greater Tit, eight years; Redstart, six years; Roller, five years.

SCHUSTER, LUDWIG. Einige Bemerkungen zum Brutgeschäft des Kleinspechts. *Beiträge z. Fortpflanzungsbiol. d. Vögel*, 12: 221-225, Nov. 1936.—A study of the nesting of the Lesser Spotted Woodpecker (*Dryobates minor hortorum*) near Lienezwitzer Lake, Germany. Both sexes took part in excavating the nest hole, but the male took the larger share. Other observers have averred that the male or the female exclusively performs this labor, but the probability is that there is considerable variation in the behavior of individual pairs. The female when desiring coitus, regularly flew to the hole, then after clinging a moment, at once flew to where the male was perched near the top of a neighboring tree, where copulation took place, on a limb. The male in this instance did most of the incubation during the day, and apparently all of it during the night. In two days, only the male was seen feeding the young, though the author does not mention the possibility that the female had been killed meanwhile, for in other cases both sexes are said to share.

SCOTT, CARROLL D. Who killed the Condors? *Nature Mag.* (Washington, D. C.), 28: 368-370, 4 text-figs., Dec. (= Nov.) 1936.—Reviews the decrease in the numbers of California Condors, which began with the great influx of settlers about 1850. Within the two decades following, Condors were exterminated in the northwest and middle parts of California. In the '80's they were obviously fewer in the

southern areas and were largely gone even by the middle '90's. The author believes this extermination was mainly due to the increasing human population and wanton shooting of the birds, rather than to poisoning as commonly believed. He fails to recognize that a contributing factor may have been the transformation of large areas from cattle ranches to fruit farms and the reduction in numbers of large game mammals and predators, thus reducing the potential food supply of dead carcasses, for large birds require proportionate amounts of food. Two of the figures reproduce photographs of living condors by Finley and Bohlman.

SIVONEN, LAURI. Die Stärkevariation des nächtlichen Zuges bei *Turdus ph. philomelos* Brehm und *T. musicus* L., auf Grund der Zuglaute geschätzt und mit der Zugunruhe einer gekäfigten Singdrossel verglichen. *Ornis Fennica*, 13: 59-63, 4 text-figs., July 1936.—The Song Thrush and the Redwing Thrush migrate at the same time in southern Finland, giving their characteristic call note as they pass over by night. Observations were made between 6 o'clock and 1 o'clock at night, by counting the birds heard passing, after which these were plotted for ten-minute intervals for the separate days in October. On three different nights the height of migration was between eight or nine and ten o'clock. A chart prepared to show night activity of a caged thrush during the same period, shows a close correlation between its times of "migration urge" and those of the wild birds. Of the five migration waves during the month, four coincided with falling barometer, and the fifth with rising barometer but falling temperature, the last regarded as causative.

SIVONEN, L., AND PALMGREN, P. Ueber die Einwirkung der Temperatursenkung auf die Zugstimmung bei einer gekäfigten Singdrossel (*Turdus ph. philomelos* Brehm). *Ornis Fennica*, 13: 64-67, 1 text-fig., July 1936.—Experiments were made with a caged Song Thrush kept in a laboratory in Finland, to see if by artificially lowering the temperature of the cage, enclosed in a large container, the bird would show a corresponding disposition to start migration by night activity. The experiments were carried on from November 5 to December 31. Without exception, in each of five cases in which the temperature was dropped to nearly freezing point, the bird showed a renewal or a strong increase of the migration urge, as evidenced by night-time restlessness, except that the final temperature drop, about Dec. 25-26, brought forth no response, since the disposition to migrate was now at its normal close. The authors suppose that the fall of temperature is accompanied by increased metabolism, by body-temperature regulation calling forth the migratory urge. They seem not to have considered the concomitant shrinking of the genital glands, which Rowan has shown to be closely correlated with the desire to migrate.

SKAGGS, M. B. The occurrence of white herons in the Youngstown, Ohio, region. *Wilson Bull.*, 48: 269-272, Dec. 1936.—Presents records gathered since 1918 for American Egret, Snowy Egret, and Little Blue Heron. An American Egret was seen at Youngstown on July 29, 1918, but no more until 1924, when all three of the species named appeared; in 1925 a single Egret was seen in August. Since 1930, white herons have notably increased. In that year seven Egrets and numbers of Little Blue Herons are recorded. In 1933, the proportions were reversed, for the Egrets outnumbered the latter, and a single Snowy Egret appeared. As many as fifty American Egrets were seen in one day. In 1934, the Little Blue Heron was the most common of the three, with as many as seven Snowy Egrets on August 14. All the Little Blue Herons have been the immature white-plumaged birds.

S[NYDER], L. L. The Starling in Ontario. *Roy. Ontario Mus. Zool.*, Toronto, leaflet

- no. 4 (reprinted from Bull. 6), 4 pp., Jan. 1937.—A brief popular account of the spread and local effects of the Starling in Ontario. They are now permanently established as far northwest as Port Arthur and have been seen as far north as Moosonee and York Factory, with occasional records from Manitoba and one from Alberta. The large flocks in autumn and winter consume much food that might be available for other species, and their early nesting excludes many native birds from nest-holes. The bird-eating hawks, such as Cooper's and Sharp-shinned Hawks, and some owls seem to be their chief natural enemies. Of forty Cooper's Hawks killed in 1931 and 1932, seventeen had eaten Starlings.
- S[NYDER], L. L. About birds in winter. Roy. Ontario Mus. Zool., Toronto, leaflet no. 9 (reprinted from The School), 4 pp., Jan. 1937.—A contrast is drawn between the winter land birds of Baffin Land, namely the Rock Ptarmigan and the Raven, and those of the Algonquin Park and southern Ontario, where different conditions make possible a larger winter avifauna.
- STONE, WITMER. Zoological results of the George Vanderbilt African Expedition of 1934. Part VI,—Birds. Proc. Acad. Nat. Sci. Philadelphia, 88: 529-598, Dec. 23, 1936.—A report on a collection of nearly 1300 birds representing 417 forms made during a five months' journey across equatorial Africa from Mombasa in the east to the Belgian Congo, and across French Equatorial Africa from the Ubanghi-Shari region to the Cameroons. Significant of the comparative thoroughness with which the birds of this region are known, is the fact that no new forms are described; however, there are many significant notes on the validity of various races whose recognition was previously doubtful. The careful notes of the collector, James A. G. Rehn, as to color of iris, bill and feet are given. The species, with critical remarks, are listed in three sections: those of the Kenya and Uganda region; those of the Belgian Congo; and those of French Equatorial Africa, thus emphasizing the important differences and similarities in the avifaunas of these ecologically different areas.
- STONER, DAYTON. Wildlife casualties on the highways. Wilson Bull., 48: 276-383, Dec. 1936.—Summaries are given of the numbers of reptiles, birds and mammals noted as killed by motor traffic on highways between Albany and Iowa City, a distance involving over two thousand miles. The highest mortality was found to be in agricultural States, among domesticated and semi-domesticated animals. In over eight thousand miles, the number of casualties noted was 1277. An extensive bibliography on this subject is appended.
- TECHNAU, GERT. Die Nasendrüse der Vögel. Zugleich ein Beitrag zur Morphologie der Nasenhöhle. Journ. f. Ornith., 84: 511-617, pl. 4-6, 26 text-figs., Oct. 1936.—A general investigation of the nasal glands and the morphology of the nasal chamber in the major groups of birds. According to their situation and development, the nasal glands, which appear as small brown masses, may be regarded as of three types: (1) those having a preorbital position in the sinus orbitalis of the eye; (2) those lying within the orbit or along its border, a group which includes a wide range of modifications; and (3) those that are supraorbital in position, lying in a deep supraorbital groove which may or may not be open at its lateral border. Usually each gland is more or less divisible into two sections, which send their secretion through a common duct to the anterior chamber of the nasal cavity. A simpler condition is found in the African Ostrich, the Galli, the bustards, grebes, penguins, the steganopods except the Tropic-bird, and a few others, in which the mass is single. The glands are wanting in the cassowaries, the Hoatzin, sand grouse, screamers, as well as in the Whale-headed Stork and the toucans of the

genus *Rhamphastos*. In these, the orbital gland to some extent takes the place of the nasal gland. In woodpeckers there is a tongue gland, comparable with the maxillary gland of ducks, opening on the roof of the bill chamber near its tip. The volume of the nasal glands is correlated with their position: the smallest and most primitive type, the preorbital, occurs particularly in land birds; the medium-sized or orbital glands are found in birds of inland waters; while the largest and best-developed type, the supraorbital, is found in birds of ocean and seacoast or of brackish water. It may vary in development in accordance with the habitat even in close-related genera or species. In general, its function is to bathe the mucous membrane of the anterior chamber of the nasal cavity with its secretion thereby cleansing the air breathed in before its entrance into the second chamber, with probably the added function in waterbirds of arresting the progress of minute particles of foreign matter that may be forced into the cavity during feeding, while in marine birds in which the glands are best developed, their secretion probably helps to counteract the irritation of salt on the mucous membrane of the nasal chamber. The latter is divided into three sections, anterior, middle, and olfactory. The turbinal bones are contained within these chambers, the last or uppermost being the best developed. In the Turkey Vulture and the Fulmar these bones seem especially well developed and scroll-like, a fact perhaps to be correlated with some power of scent.

TUCKER, B. W. An observation of the roosting of swifts. *British Birds*, 30: 206-208, 1 text-fig., 1 Dec. 1936.—After the breeding season adult Swifts (*Apus apus*) in Corsica were observed to spend the night perched on an old nest in a recess of a roof. Daytime activity commences at about the time of sunrise.

VÖLKER, OTTO. Ueber den gelben Federfarbstoff des Wellensittichs (*Melopsittacus undulatus* (Shaw)). *Journ. f. Ornith.*, 84: 618-630, 2 text-figs., Oct. 1936.—The author previously showed that birds display a marked selectivity in the deposit of carotin-like pigments derived from their plant food. This deposit may take place in fatty tissue of certain species, as well as in the feathers, scales, and bill; but only in the case of lutein and its isomere, zeaxanthin. The lutein is either laid down directly or under specific change. Carotin, lycopin, and the xanthophylls,—taraxanthin and violaxanthin,—are not so deposited. The apparent exception is capsanthin, the coloring matter of red pepper, which is a xanthophyll, but it is found that this xanthophyll is combined with two hydroxyls, which results in its property of coloring feathers, as in canaries. Krukenberg first described the yellow pigment of certain parrots as psittacofulvin, but the present investigation shows that the yellow pigment of the Grass Parrakeet is different in its chemical and spectroscopic properties. By feeding birds on vegetable matter that lacks carotinoids this parrot develops yellow pigment nevertheless, hence this must be synthesized in the organism from colorless substances. Under analysis by filtered ultraviolet light, the yellow feathers of forehead and chin show a slight golden-yellow fluorescence, while the unpigmented parts of the feathers show a pale-blue fluorescence.

WELTER, WILFRED A. Feather arrangement, development, and molt of the Long-billed Marsh Wren. *Wilson Bull.*, 48: 256-269, text-fig. 39-46, Dec. 1936.—A detailed investigation of the feather tracts and moults in this species from the first to the twelfth day after hatching, with diagrams and photographs showing the areas concerned and the appearance of the young birds from day to day. Compared with the House Wren, the malar region differs in being conjoined to the auricular region by a few intermediate feathers; while the auricular and the

postauricular patches are hardly separated from each other, whereas in the House Wren they are distinct. There are seven pairs of under tail-coverts. The vestigial eleventh primary found by Boulton in the House Wren was not noted in the Marsh Wren. In opposition to the results of Dwight and Stone, the first-winter plumage involves a renewal of rectrices and remiges. There seems to be no evidence of a regular prenuptial moult, but differences of appearance between this and the winter plumage are due to wear.

WETMORE, ALEXANDER. Two new species of hawks from the Miocene of Nebraska. Proc. U. S. Nat. Mus., 84: 73-78, text-fig. 13, 14, Dec. 1936.—The new species are: *Palaeoborus howardae* and *Falco ramenta*, both based on the distal end of tarsi from Miocene formations in Dawes County, Nebraska. The former is of special interest as a member of the subfamily Aegypiinae, now confined to the Old World; the second takes the genus *Falco* back in North America to at least the middle Tertiary. Incidental examination of the co-types of *Falco falconellus* Shufeldt proves that they represent fragments of at least three orders of birds and that the name must be regarded as unidentifiable.

ZIMMER, JOHN T. Studies of Peruvian birds. XXII. Notes on the Pipridae. Amer. Mus. Novitates, no. 889, 29 pp., Oct. 19, 1936.—Comparative notes on manakins chiefly found in Peru, with remarks on distribution. The following new races are described: *Pipra fasciicauda saturata*, type from Rio Seco, west of Moyabamba; *Pipra aureola borbae*, type from Borba, Rio Madeira, Brazil; *Pipra pipra occulta*, type from Uchco, east of Chachapoyas, Peru; *Pipra pipra pygmaea*, type from Chamicuro, Peru; *Pipra pipra discolor*, type from Puerto Indiana, northern Peru; *Pipra pipra separabilis*, type from Tapará, Rio Xingú, Brazil; *Machaeropterus pyrocephalus pallidiceps*, type from La Prición, Rio Caura, Peru; *Manacus manacus longibarbatulus*, type from Tapará, Rio Xingú, Brazil; *Schiffornis turdinus aeneus*, type from Chaupe, Peru; *Schiffornis major duidae*, type from opposite El Merey, Venezuela.

ZIMMER, JOHN T. Studies of Peruvian birds. No. XXIII. Notes on *Doliornis*, *Pipreola*, *Attila*, *Laniocera*, *Rhytipterna*, and *Lipaugus*. Amer. Mus. Novitates, no. 893, 15 pp., Dec. 16, 1936.—Various critical notes on Peruvian members of these genera. The following new forms are described: *Pipreola riefferi confusa*, type locality Upper Sumaco, Ecuador; *Pseudattila*, new genus for *Attila phoenicurus*, in which the characters of scalation of the foot and the lack of union of the toes make it uncertain whether to place it in Tyrannidae or Cotingidae; *Rhytipterna simplex intermedia*, type locality Igarapé Brabo, Rio Tapajoz, Brazil. An important extension of range is recorded for *Rhytipterna immunda*, of which a specimen is reported upon from Santarem, Brazil.

ZIMMER, JOHN T. Studies of Peruvian birds. No. XXIV. Notes on *Pachyramphus*, *Platypsaris*, *Tityra*, and *Pyroderus*. Amer. Mus. Novitates, no. 894, 26 pp., Dec. 31, 1936.—Critical notes on rarer species, with additional records. New are: *Pachyramphus castaneus amazonus*, from Rosarinho, Rio Madeira, Brazil; *P. polychopterus tenebrosus*, from Puerto Indiana, Peru; *P. albogriseus guayaquilensis*, from Chimbo, western Ecuador. The occurrence of dichromatic phases in *P. polychopterus* is confirmed.

ZOTTA, ANGEL. Sobre el contenido estomacal de aves argentinas. El Hornero, 6: 261-270, July 1936.—The continuation of a serial article on the examination of stomachs of birds in Argentina. Many species of Passeriformes are listed with a brief statement of the nature of the stomach contents in specimens examined. The ant-birds listed appear to feed largely on beetles as well as on ants.

ZOTTA, ANGEL R., AND DA FONSECA, SECUNDINO. Sinopsis de los Ciconiiformes Argentinos. *El Hornero*, 6: 240-248, July 1936.—A continuation of the list with keys and descriptions of the Ciconiiformes of Argentina. The genera *Nycticorax*, *Tigrisoma*, *Ixobrychus*, and *Botaurus* are included, with line drawings of head, foot, wing and tail feathers of each, and there is a brief statement of distribution.

A new mimeographed publication, 'Bulletin of New England Bird-Life,' virtually continues the useful reports formerly gotten out by the Massachusetts State Board of Agriculture under the late E. H. Forbush. The first number appears under date of December 1, 1936, and it is planned to issue later numbers monthly, presenting the various phases of local bird life in convenient review. The publication of this bulletin, which is edited by Miss Juliet Richardson of the New England Museum of Natural History, 234 Berkeley St., Boston, should prove of much value in preserving a contemporary record of the local phases of ornithology, as well as in stimulating interest in the field study of birds. Subscriptions at the nominal cost of fifty cents yearly, will it is hoped, suffice to defray the cost of publication.

OBITUARIES

THOMAS EDWARD PENARD, who had been affiliated with the A. O. U. since 1912, died in Cambridge, Massachusetts, October 27, 1936, after an illness of but a few days.

Penard was born in Paramaribo, Surinam, on May 7, 1878, the second child of Frederik P. and Philippina (Salomons) Penard. He came to this country as a boy of thirteen, making his home with friends in Everett, Massachusetts, where he attended the public schools. He entered the Massachusetts Institute of Technology in 1896, graduating in 1900 with the degree of S.B. in electrical engineering. Entering the employ of the Edison Electric Illuminating Company of Boston as a draftsman in 1901, he was continuously associated with that company for the rest of his life, rising to assistant superintendant of the station-engineering department in 1931. He was instrumental in organizing the evening school at Northeastern University in Boston where he served as an instructor and for a time was Dean of the Evening Division.

The name of Penard was first known to the ornithological world through the studies of two other brothers, Frederik P. and Arthur P. Penard, whose work culminated in 'De Vogels van Guyana' published in two volumes in 1908 and 1910. While Thomas Penard had always had an interest in birds and had been quietly assembling a collection of Surinam birds, it was not until 1918 that he first began publishing a series of taxonomic papers devoted chiefly to the ornithology of tropical America, especially Surinam where his chief interest lay. While he never had received any special training in systematic ornithology, his engineer's mind was quick to grasp the fundamental principles of taxonomy and he proved an apt pupil under the kindly guidance of Outram Bangs. Between 1918 and 1927, he published, frequently in joint authorship with Bangs, over thirty titles. In addition he made a visit of several months' duration to his old home in Surinam where he spent a considerable part of his time adding to his collection, which eventually reached a total of more than two thousand skins. He was elected a Member of the A. O. U. in 1919.

Owing to pressure of work at his office, coupled with not too robust health, he was unable to continue his work in conjunction with Bangs and withdrew from active ornithological work in about 1925. His collection he sold to the Museum of Comparative Zoology in 1930. He never lost his interest in ornithology, however, and looked forward to the time when circumstances would again permit the resumption of his studies. In addition to his interest in the birds of Surinam, he was also a student of the folklore of that country and published in joint authorship with his brother Arthur, a number of papers on this subject which appeared between 1917-1929 in the 'Journal of American Folklore' and 'De West Indische Gids.' His tastes also included philately and he was a discriminating collector of books on natural-history subjects, his library containing a number of rare volumes; he also possessed a fine collection of 'Surinamiana.'

In 1905, he married Sabrina Grant who, with a son Frederick, survives. He was a member of the Mount Lebanon Lodge of Masons, American Institute of Electrical Engineers, Boston Engineers Club and several philatelic organizations, while his affiliations with organizations devoted to biological sciences included the American Ornithologists' Union, the Nuttall Ornithological Club, New England Zoological Club and the Boston Society of Natural History. *Jacamerops aurea penardi* Bangs is named in his honor. Personally, he was of a quiet and modest nature but a de-

lightful and entertaining host, possessed of a very keen sense of humor and a fund of stories and anecdotes.

Excluding articles on folklore and contributions to electrical and engineering journals, his publications are listed as follows:

1918. Starlings (*Sturnus vulgaris*) at Barnstable, Mass. Auk, **35**: 80-81.
Notes on a collection of Surinam birds. Bull. Mus. Comp. Zoöl., **62**: 25-93 (in joint authorship with O. Bangs).
1919. Remarks on Beebe's 'Tropical Wild Life.' Auk, **36**: 217-225.
Some critical notes on birds. Bull. Mus. Comp. Zoöl., **63**: 21-40 (in joint authorship with O. Bangs).
Revision of the genus *Buthraupis* Cabanis. Auk, **36**: 536-540.
Sarkidiornis sylvicola in British Guiana. Auk, **36**: 564.
The name of the Black Cuckoo. Auk, **36**: 569-570.
Some untenable names in ornithology. Proc. New England Zoöl. Club, **7**: 21-22.
The name of the Common Jungle Fowl. Proc. New England Zoöl. Club, **7**: 23-25 (in joint authorship with O. Bangs).
Two new birds from Roraima. Proc. New England Zoöl. Club, **7**: 29-31.
1920. The proper name of the West African Serin. Auk, **37**: 300-301 (in joint authorship with O. Bangs).
1921. Notes on some American birds, chiefly neotropical. Bull. Mus. Comp. Zoöl., **64**: 365-397 (in joint authorship with O. Bangs).
A new name for *Pachyramphus polychoptera costaricensis* Chubb. Proc. Biol. Soc. Washington, **34**: 78 (in joint authorship with O. Bangs).
Lophotriccus versus *Cometornis*. Proc. Biol. Soc. Washington, **34**: 78 (in joint authorship with O. Bangs).
Descriptions of six new subspecies of American birds. Proc. Biol. Soc. Washington, **34**: 89-92.
The name of the Eastern Hermit Thrush. Auk, **38**: 432-434 (in joint authorship with O. Bangs).
1922. A new form of *Edolus forficatus* (Linné). Proc. New England Zoöl. Club, **8**: 25-26 (in joint authorship with O. Bangs).
A new hummingbird from Surinam. Proc. New England Zoöl. Club, **8**: 27-28.
The northern form of *Leptotila fulviventris* Lawrence. Proc. New England Zoöl. Club, **8**: 29-30 (in joint authorship with O. Bangs).
The identity of *Attila flammulatus* Lafresnaye. Proc. Biol. Soc. Washington, **35**: 223-224 (in joint authorship with O. Bangs).
The type of *Pachyramphus polychopterus* (Vieillot). Proc. Biol. Soc. Washington, **35**: 225 (in joint authorship with O. Bangs).
A new name for the Rufous-chested Flycatcher. Proc. Biol. Soc. Washington, **35**: 225 (in joint authorship with O. Bangs).
The identity of *Hylophilus leucophrys* Lafresnaye. Proc. Biol. Soc. Washington, **35**: 226 (in joint authorship with O. Bangs).
1923. Two new forms of Surinam birds. Proc. New England Zoöl. Club, **8**: 35-36.
A new bulbul from Fukien, China. Proc. New England Zoöl. Club, **8**: 41-42 (in joint authorship with O. Bangs).
A new Merops from Java. Proc. New England Zoöl. Club, **8**: 43 (in joint authorship with O. Bangs).

- Status of *Spermophila schistacea* Lawrence. Proc. Biol. Soc. Washington, **56**: 59-62.
- A new flycatcher from Surinam. Proc. Biol. Soc. Washington, **8**: 63-64.
- The identity of Gmelin's *Todus plumbeus*. Auk, **40**: 334-335.
- A new tanager from Surinam. Occ. Papers Boston Soc. Nat. Hist., **5**: 63.
1924. The identity of *Trochilus ruckeri* Bourcier. Occ. Papers Boston Soc. Nat. Hist., **5**: 77-78 (in joint authorship with O. Bangs).
- Nesting of Great Blue Heron in Boothbay, Maine. Auk, **42**: 128.
1925. A new Blue Water-Thrush from China. Occ. Papers Boston Soc. Nat. Hist., **5**: 147 (in joint authorship with O. Bangs).
- The Henry Bryant types of birds. Bull. Mus. Comp. Zool., **67**: 197-207 (in joint authorship with O. Bangs).
1926. Warblers at sea. Auk, **43**: 376-377.
- Birdcatching in Surinam. De West Indische Gids, **7**: 545-566 (in joint authorship with A. P. Penard).
1927. The Duck Hawk in Guiana. Auk, **44**: 419.
- Eggs of the Sun Parrot. Auk, **44**: 420-421.
- The Yellow Warbler (*Dendroica aestiva aestiva*) in Dutch Guiana. Auk, **44**: 425-426.
- . Historical sketch of the ornithology of Surinam. De West Indische Gids, p. 1-24 [separately paged reprint].

—J. L. P.

RICHARD CRITTENDEN MCGREGOR, a member of the American Ornithologists' Union since 1889, and a Fellow since 1907, died at Manila, Philippine Islands, on December 30, 1936, of pernicious anemia, at the age of sixty-five. He came to the Philippines in 1901 and was for many years associated with the Philippine Bureau of Science. For nearly thirty years he was editor of the Philippine Journal of Science. He started as an entomologist, but subsequently became well known for his work on Philippine birds, of which he published a check-list. At the time of his death he was Chief of the Division of Publications and Agriculture of the Islands.

FREDERIC HEDGE KENNARD, who joined the American Ornithologists' Union in 1892, and was made a Member in 1912, died after a brief illness on February 24, 1937, in his seventy-second year. At his home in Brookline he had built up a large collection of the eggs and nests of New England birds, and of bird skins of North American species. Most of the latter he had transferred to the Museum of Comparative Zoology some years before his death. One of his earlier papers dealt with the delimitation of hunting territories of the Red-shouldered Hawks at a time when this matter had received little attention. In later years he became especially interested in the habits and status of the group of Snow Geese, and made numerous journeys to the South to observe them and other species. A further account of his life will appear later.

WILLIAM HENRY HOYT "ornithologist, inventor and artist," passed away at his winter home in Palatka, Florida, on December 6, 1929. Descended from old Colonial stock, his earliest American ancestor, Simon Hoyt, came from England to Salem, Massachusetts, in 1629 and settled in Stamford, Connecticut; from that time his family were among the most honored residents of that city. Born in Stamford on July 24, 1855, the son of Harvey and Emily Frances (Selleck) Hoyt, he attended the Wilbraham (Mass.) Academy, the Academy of Design in New York and the Union Art League. Art was thus his first love as it was his last. His earliest efforts were in

painting flowers in water-colors, while landscapes and bird portraits in oil occupied his declining years. But in this art his inventor's instinct was uppermost. His aim was to invent a process through which the airy gracefulness and glowing colors of birds could be perpetuated in their full beauty, and in some of his later work he must almost have attained his ideal. But this sort of portrayal of flowers and birds did not satisfy his love for beauty, and in 1882 he moved to Palatka, Florida, where he opened a taxidermist's establishment and for ten years strove to mount birds as objects of art and beauty, and to use bird plumage in various ways to satisfy his artistic sense. But, though he strove always for beauty, his mind did not find this alone satisfying, and he soon became interested in ornithology, and this interest was with him the rest of his life. Writing he felt was not his method of expression; but he studied his specimens carefully and collected at various times goodly series of beautiful skins in Florida, Connecticut, Cape Cod and North Dakota. His longest trip was with the author and three other ornithologists to North Dakota, where at Cando, Towner County, and on the shores of Rock Lake, we collected for one hundred days in the spring of 1895, when the prairies were still in their pristine loveliness and abounding in bird life. This trip, in its advancement of our knowledge of birds, its freedom of life in the wilderness and its social joys, none of us will ever forget. Hoyt was beloved of us all, and one of the party called him the kindest man he ever knew and another the most unselfish. *Otocoris alpestris hoyti*, the type series of which was collected on this trip, was named in his honor.

He was a heavy man, and soon after the beginning of our Rock Lake sojourn discovered he no longer had the endurance for tramping long distances and wading the prairie sloughs, and had to spend much of his time resting. Thus less than twenty years covered his active field-work; but during that time he added that strange hybrid, *Vermivora lawrencei*, to the avifauna of Connecticut, collecting an adult male at Stamford, May 12, 1886. His interest in ornithology never abated; he was an Associate of the American Ornithologists' Union for ten years (1888-1898), and frequently led those interested in birds and flowers on country walks near Stamford.

Yet another outlet for his energy must be mentioned, his inventive talent. Impressed by the loveliness of the interior of the cornstalk, he invented 'Zea Pitha Ware' from it, in which he made vases and other articles and decorated them with water-colors of flowers and grasses. Most perishable ware, it is true, but for its grace and beauty it found a market in Florida for years and also at Tiffany's in New York. Other of his inventions were a keel kite and a moving window-sign operated by clockwork.

On January 30, 1906, he was married to Martha Becket Gray, daughter of Henry and Eliza (Becket) Gray of Palatka, Florida. This was the true romance of his life. On one of his early trips to Florida he became very fond of a little girl, the daughter of his host, and this attachment grew each time he revisited Palatka, and was reciprocated, culminating twenty years later in their marriage. By her death in 1927 he lost forever the zest of living.

At his death he left his collection of scientific bird skins and eggs to the author of this sketch, though circumstances had prevented our meeting for many years. To know Will Hoyt as I did in North Dakota and at the Bristol Brantling Club at Monomoy, Mass., and to study the shorebirds there with him was to form a friendship the separation of years could not break. A firm, true and unselfish friend and a delightful companion, he will be always missed by those that knew him well.—

LOUIS B. BISHOP.



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